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The Development of a Motor Performance Checklist for Identifying Physically Awkward Children

University — Université

University of Alberta

Degree for which thesis was presented — Grade pour lequel cette thèse fut présentée

Masters

Year this degree conferred — Année d'obtention de ce grade	Name of Supervisor — Nom du directeur de thèse
1982	Dr. A. E. Nall

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THE DEVELOPMENT OF A MOTOR PERFORMANCE CHECKLIST FOR IDENTIFYING PHYSICALLY AWKWARD CHILDREN

by

© ELLEN F. UMANSKY

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

DEPARTMENT OF PHYSICAL EDUCATION

EDMONTON, ALBERTA

SPRING, 1983

THE UNIVERSITY OF ALBERTA

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Date September 22, 1982

ABSTRACT

The present study attempted to develop a checklist of overt motor activities to differentiate children with motor performance difficulties from their normal peers. Twelve physically awkward children and 14 children of average ability were rated on 26 gross-motor activities by grade 3 teachers. Fourteen physically awkward and thirteen control subjects were rated on 30 items by grade 5 teachers. A Kruskal-Wallis one-way analysis of variance by ranks corrected for ties identified 16 items of the Grade 3 checklist that significantly differentiated the physically awkward and control groups. Seventeen items proved to be significant discriminators on the grade 5 checklist. Alpha coefficients of .91 and .95 for the grades 3 and 5 confirmed the internal consistency of the checklists.

ACKNOWLEDGEMENTS

I would like to thank my advisor, Dr. A.E. Wall, who was instrumental in the design of the thesis and the editing of several chapters. I am grateful for his patience and encouragement during all stages in this project. He has been a source of inspiraton and moral support throughout my stay in Edmonton.

Several other people have helped to make the completion of this thesis a reality: Dr. Jane Watkinson, Dr. Bob Muleahy and Dr. R. Steadward for their insightful comments and criticisms in all areas related to this thesis; the teachers in the Edmonton Separate School Board and their students for their participation in the project; Ms. Pat Bates for her assistance in the proof-reading and printing of the thesis.

Finally, I would like to thank my family and friends for the love and encouragement they provided.

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CHAPTER I

INTRODUCTION

The Concept of Physical Awkwardness

Proficiency in play and games is an important factor in the social and emotional development of children. A crucial element about physical proficiency is that it is open to the evaluation of others. Therefore, inadequate motor performance can result in negative reactions from peers (Wall, 1981). This may lower a child's self-esteem and result in a withdrawl from physical activities. This decrease in practice opportunities may result in a lowered physical fitness level as well as a reduction in the level of proficiency in motor skills.

Controversy exists over the underlying cause of physical awkwardness. Amongst the various theoretical viewpoints are those of the perceptual-motor theorists, neurologists and motor development researchers (Lerner, 1976).

In the present study, physically awkward children will be defined as children without known neuromuscular problems who fail to perform culturally-normative motor skills with acceptable proficiency. Proficiency in skill is characterized by purposeful, planned, accurate and precise motor behaviour; however, the bandwidth of acceptable proficiency will vary with the age, sex and socio-cultural environment of the person (Wall, 1981).

The Need for Early Identification

Physically awkward children are going unrecognized both in the physical education class and in the playground (Illingsworth, 1963;

Oliver & Keogh, 1967). As some investigators have suggested this may be due to the fact that teachers are not as well informed about motor development, either normal or abnormal, as they are about other aspects of child development (Henderson & Hall, 1981). Physical disabilities such as cerebral palsy, spina bifida or blindness are usually apparent. Physical awkwardness is not as obvious a developmental difficulty. Appropriate early identification screening instruments might help to avoid wrongly classifying children as being physically awkward (Morris & Whiting, 1971; Reynard, 1975). In particular, erroneous labelling with words such as 'lazy' or 'unmotivated' may be reduced if the child's problem is correctly identified. Until teachers are able to identify motor performance difficulties earlier, attempts to remediate physical awkwardness will continue to be initiated later than they should. It should be noted as well that routine developmental screening tests used by medical doctors on pre-school children often do not help in the detection of children who are physically awkward. The young child often develops motor difficulties upon entering school as the demands of the school environment may be much greater than he or she has experienced in the home environment. Once teachers can identify the problem, further referral and evaluation can occur. Additional benefits of early identification are the provision of guidance to parents (Gulliford, 1976) and the initiation of remedial action (Gulliford, 1976; Wolfendale, 1976).

The Value of Checklists

A checklist is a screening instrument which has many advantages over standardized motor performance tests. Prior to discussing the value of a checklist, a clarification of the terms screening and assess-

ment are in order. Olien and Rodabaugh (cited in Loovis, 1975, p.14) give a succinct definition:

> "Screening instruments are relatively short, of surface nature, and indicate the possibility of a variance in development.
>
> Assessment instruments are more lengthy, of an indepth nature, and analyze the problem and make differentiations."

The most obvious benefits of checklists are as follows: they are inexpensive, easy to use, require a minimum of time and may require little or no training of those using them. Also, children are not affected by the use of a checklist. Since observation is unobtrusive, their usual performance should not be altered. A checklist provides a more comprehensive picture due to the fact that performance is not based on one test at a single point in time. Performance often fluctuates. It is pointed out by Weiner (1979) that a symptom does not necessarily mean a learning disorder because any child can have difficulty learning at some time in some situation. The results of checklists are usually based on observations that have been made over a period of time. Therefore, the items that indicate difficulty are more representative of the child's typical performance.

An ecologically valid checklist should consist of activities that occur in everyday environments. Furthermore, they should cover a broad array of skills in the domain that is being screened.

Teachers as Observers

Checklists are based on observation. Herbert (1970) stresses the value and use of observation. Information can be gathered simply, inexpensively and quickly.

The literature suggests that teachers are in the best position to observe children and to gather information about them (Dickinson, 1980; Keogh, 1977; Reynard, 1975; Spivak & Swift, 1973; Summers, 1977). It has also been shown that teacher ratings discriminate children with learning difficulties from normal controls and these observations have some stability across time (Hicks et al, 1981; Spivak & Swift, 1973). In addition, Thurlow and Yesseldyke (1979) contend that teachers have a major responsibility in the entire screening and assessment process. In fact, they are the most frequently cited referral source for psychoeducational assessment. These observations suggest that teachers are therefore very suitable candidates to make use of a motor behaviour screening device.

Early Attempts to Develop Motor Checklists

Some attempts have been made to develop motor checklists. Godfrey and Kephart (1969) designed a checklist to evaluate the qualitative aspects of movement patterns. A 29-item checklist was developed by Sugden (1972) consisting of classroom tasks, playground tasks and behaviour related to physical activities. A screening instrument was devised by Gubbay (1975) in the form of a questionnaire for teachers to use in the identification of children with motor performance difficulties. The Ohio State University Scale of Intra-Gross Motor Assessment (Loovis, 1975) also attempts to identify children with poor motor proficiency.

Although each of these screening devices show some potential, problems exist with each of them. Some general areas of concern are the lack of data on their validity and reliability. The items comprising

these checklists often include very few culturally-normative motor skills, they do not adequately tap the motor domain, and they are often not written in clear behavioural terms. Some of the checklists contain social behaviours related to motor performance.

The present study is concerned with the development, implementation and evaluation of a motor behaviour checklist.

Delimitations

The initial subject pool was chosen from the IBM-University of Alberta Learning Disabilities project (University of Alberta, 1982). The subjects in the present study were selected from this group on the basis of results from a motor performance test battery. Checklists were developed for 3 age groups: 6-7-year olds, 8-9 year olds and 10-11 year olds. Only 8, 10 and 12 year olds were administered the motor performance test in the parent project. As a result, the criterion-referenced validity aspect of the study was restricted to the eight and ten year old age groups. Therefore, the checklists were used only by teachers who taught grade 3 (8 year olds) and grade 5 (10 year olds). Checklist items consisted strictly of culturally-normative motor tasks.

The number of subjects was restricted to those identified as being physically awkward on the motor performance test battery. The number of controls and other randomly selected subjects was also dependent upon the physically awkward subjects that were chosen. It was assumed that the motor performance test accurately identified the children with motor performance difficulties.

Items on the checklist were judged to be culturally-normative motor activities related specifically to the Canadian culture. There-

fore, a few items such as skating or catching a softball will limit the generalizability of the checklists.

Inter-rater reliability was not feasible. The teachers were not familiar with students in other classes or other schools. Therefore, it was not possible for more than one teacher to rate the same child.

Limitations

In some schools, the classroom teachers did not teach Physical Education. Also, some of the apparatus such as bikes or tetherballs were not present in the schoolyard. Some teachers would not have had the opportunity to observe some of the motor tasks; therefore they had to predict how well the children could perform certain of the tasks. No differentiation between the rating of predicted and observed items was made in the analysis of the data.

It was also not possible to perform a test re-test to check reliability. The school year was coming to an end and teachers were very busy. For the sake of maintaining positive public relations, it was decided to be in the best interest of all concerned to avoid another testing situation.

The Problem

Can a motor behaviour checklist be developed and used by teachers such that the results from it differentiate a defined criterion group of physically awkward children from their matched controls at grade 3 and 5?

Sub-problems

a) Which items on the gross motor scale differentiate between the two groups at each grade level?

b) Which items on the fine motor scale differentiate between the two groups at each grade level?

c) If the above items do in fact differentiate between the groups, how internally consistent are these items in the identification process?

d) What is the reaction of the teachers to the checklist after using it?

CHAPTER II

REVIEW OF THE LITERATURE

Physical Awkwardness

Orton (1937) was one of the first to recognize that a number of children suffer from abnormal clumsiness in physical performance and that this clumsiness was clearly distinct from that arising from pyramidal, extrapyramidal or cerebellar dysfunction. Orton included abnormal clumsiness or developmental apraxia as one of six common developmental disorders.

In his book, he reports that:

> One such boy recently studied, had been slow in learning to walk and was awkward in his gait. He had mastered with some effort the riding of a three-wheel velocipede but the bicycle proved too much for him. Roller skating was likewise impossible for him as was baseball and almost all the games of boyhood. In his case, his difficulty in learning motor patterns extended also to speech and writing (p.121).

Gubbay (1975) reported that Doll (1951) had probably identified clumsy children when "he described the syndrome of neuromuscular impairment other than typical cerebral palsy which was not easy to recognize" (p.36). Doll suggested that problems in clumsiness might be associated with perceptual difficulties that might contribute to visual, auditory and language handicaps.

Walton, Ellis and Court (1962) presented a number of case studies of children with movement problems. They state that:

> No two children are exactly alike in physical or in mental constitution, and whereas some children are lithe and graceful in their movements, in others the co-ordination and control of muscular activity is much less efficient; movements, whether simple or complex, are performed with an excessive expenditure of energy and with inac-

> curate judgement of the required force, tempo and amplitude. Such individuals are often incapable of achieving even an average standard of performance in athletic activities, or of acquiring those skills which depend upon manual dexterity. They should be regarded as having a disorder of movement which makes them constitutionally 'clumsy' (p.603).

This group of researchers was one of the first to use 'clumsy' to describe children with developmental apraxia and agnosia.

In a follow-up study, Gubbay, Ellis, Walton and Court (1965) reported on an intensive investigation of 21 children with developmental clumsiness that they conducted in Newcastle upon Tyne, England. The clumsy children in this study were given complete neurological examinations along with an extensive battery of fine-motor and gross-motor tests. They reported that the underlying causes of developmental clumsiness in this group of children included delayed maturation, inadequate establishment of cerebral dominance, and structural lesions in the parietal lobes. "All of the children manifested cognitive and performance defects which could be classified as various forms of apraxia and agnosia. Seven of the subjects showed minor collateral evidence of brain dysfunction including minimal signs of pyramidal or cerebellar dysfunction which were not sufficiently severe to cause their clumsiness" (p.311). As a result of this study Gubbay (1975, p. 93) stressed "the need for the development of convenient, standardized tests of motor ability which would facilitate the recognition of 'clumsy children'."

Brenner, Gillman and Farrell (1968) supported the contention by Gubbay et al (1965) that developmental agnosia and apraxia syndromes were much commoner than was generally supposed. In a study of 14 children, clumsiness or poor motor co-ordination was found in a high proportion of the children, but was virtually absent in the controls.

Reuben and Bakwin (1968) feel that there are children who are unusually clumsy for no demonstrable reason. "They are awkward in the performance of everyday activities requiring ordinary manual dexterity and lack the physical skills needed in school and athletics" (p.601). They also stress the need for early recognition to alleviate the situation.

Dare and Gordon (1970) noted that the motor development of clumsy children was delayed. They stressed the notion that clumsiness should be defined in relation to age appropriate development. The clumsy child "does not learn tasks such as doing up buttons or tying shoelaces at the appropriate age, is always dropping things and falling, and has difficulties in taking part in games, in writing, even in copying" (p.178). They suggested that a variety of factors were associated with the visuo-motor disabilities of clumsy children. Some children had a specific disability, others showed evidence of minimal cerebral palsy, while others seemed to be slow in all aspects of development. They suggested that two major types of movement learning difficulties should be considered; those associated with perceptual difficulties and those of motor organization. They contended that "if the defect among certain children lies in the building up of the patterns and memory of movements then the problem can be remediated through more practice or by learning other ways of performing the motor response" (p.182). In contrast "those related to severe perceptual difficulties might require more precise verbal directions and special help with spatial orientations" (p.182). They called for early assessment and detection of the problem, and provided sound advice to parents and teachers on management approaches to the problem.

There are many children at any particular age who may be described as clumsy. McKinlay (1978) used the term to describe children "without frank neurological disorder whose postural, balancing or manipulative faculties fall outside the normal range for their age" (p.494).

Gordon and McKinlay (1980) in their recent book extend some of their earlier work. They define clumsy children as follows:

> Clumsy children show difficulties in motor co-ordination out of proportion to their general abilities. They commonly but not invariably, have co-existing learning difficulties. Their disabilities may lead to secondary emotional problems including frustration or social isolation. Thus, a child of whatever chronological age whose general abilities are those of an eight-year-old but whose co-ordination skills are typical of a five or six-year-old will be regarded as clumsy (p.1).

They suggest that the causes of clumsiness range from cerebral degenerative diseases and progressive neuromuscular conditions to head injuries and defective vision. They stress the developmental nature of the problem and report on Orton's (1937) earlier recommendations that the remedy for clumsiness is "punctilious training in some sport or manual craft so that this can compensate for more general awkwardness" (p.2). They note that even though Orton made these comments over 48 years ago that very little has been done to treat or remediate the difficulties experienced by these children.

Gordon and McKinlay (1980) stress that "there is no typically clumsy child. The clinical picture will vary greatly, depending on such factors as the reasons for the incoordination, sensory or motor, the age of the child and a variety of genetic and environmental influences" (p.3).

Gubbay (1975) has written an extensive monograph on his research in the area of developmental clumsiness. He was the first to use the term developmental clumsiness in order to stress the developmental

aspect of the problem of motor performance. In his discussion of developmental clumsiness he stated: "surely clumsiness, like intelligence, is a comparative term contingent upon normally accepted standards which increase with chronological age" (p.2). He defined the clumsy child "as one who is mentally normal, without bodily deformity, and whose physical strength, sensation, and co-ordination are virtually normal by the standards of routine conventional neurological assessment, but whose ability to perform skilled, purposive movement is impaired" (p.39).

Gubbay presented an extensive review of the literature in which he identified motor difficulties associated with a number of causal factors. His review of causal factors included progresssive motor defects such as cerebral and cerebellar tumours, metabolic diseases, degenerative disorders including ataxia and other spinocerebellar dysfunctions, and neuromuscular diseases such as progressive muscular dystrophy. He also identified a number of non-progressive motor defects in children including congenital encephalopothies, and minimal cerebral dysfunction including visumotor disability, developmental dyscalculies, dyslexia, and speech dysfunctions.

Stott (1966, 1972, 1977) was one of the first psychologists interested in the identification and remediation of children with motor difficulties. He contended that neural dysfunctions of a minor degree would most likely affect motor responses. He further states that "whatever the cause, if there is a failure to control or co-ordinate simple actions, without discernible physical disability, it is reasonable to infer neural dysfunction of some sort" (1966, p.526). He and his colleagues developed the Stott Test of Impairment based on the earlier

work of Oseretsky. The test is a measure of impairment rather than the whole range of ability. The rationale for the development of such a test came from the theoretical uncertainties surrounding the origin of behaviour disturbance and learning disability.

Henderson (1981), an early co-worker of Stott, has recently espoused the view that physical awkwardness (motor impairment) is not a unitary syndrome. She contends that although some children that have been labelled 'clumsy' do appear to have problems that are exclusively motor in nature, that in fact, such cases are relatively rare. Henderson believes that a more detailed analysis usually reveals concomitant disorders such as speech disorders, social immaturity, below average intelligence, and low academic achievement.

Keogh (1977) has placed the problem of physical awkwardness into a developmental framework. He notes the importance of establishing whether a child has achieved movement consistency. He defines movement consistency as the development of a repertoire of movement skills that are characterized by the efficient patterning and ordering of movements to solve everyday living problems in an appropriate and reliable way. A more difficult movement problem for an individual is the development of movement constancy, the flexible use of movement consistencies in a variety of movement situations. Skills need to be practiced in situations requiring a high level of predictability first as in throwing and catching a ball with a partner. As the spatial and temporal demands increase, the child must be able to predict and use flexibly the skills that are learned during the movement consistency phase of motor development.

Keogh and his associates are concerned about the lack of appropriate assessment instruments to aid in the identification of physically awkward children. Keogh et al (1979) compared different identification procedures. One of these methods was Sugden's (1972) motor checklist. However, the different procedures did not identify the same children as being physically awkward.

Wall (1982) defines physically awkward children "as children without known neuromuscular problems who fail to perform culturally-normative motor skills with acceptable proficiency. Proficiency in skill is characterized by purposeful, planned, accurate and precise behaviour" (p.2). He contends that a child goes through stages in the development of motor skills. In the early stages of motor development, skills are performed that require the processing of relatively low spatial and temporal information loads. Therefore, the amount of prediction that is required prior to the initiation of a response is relatively low. This stage is comparable to Keogh's consistency phase of motor development. As the child grows older, the task demands with which he or she must cope rapidly increases. Skills such as bouncing, throwing, catching, striking and kicking are characterized by increases in spatial and temporal uncertainty and the use of prediction and other strategic behaviours are required. In order to participate in fast-paced play and sport environments, children must use higher-level cognitive motor plans. The development of these higher level plans depends on practice which facilitates the development of skillful performance. However, physically awkward children demonstrate a lack of skill in cognitive-motor tasks thereby preventing them from achieving

the level of acceptable skill proficiency which is required for successful participation in culturally-normative motor skills. As these children grow older it becomes increasingly difficult to perform the expected perceptually and cognitively-loaded motor skills involved in game and sport situations, which in turn prevent them from practicing the very skills that they should be learning. Based on these factors, Wall stresses the importance of developing appropriate assessment, prescriptions and remedial services for these children.

The message is clear that a definite sub-group of learning disabled children exists; that is, those who have difficulty in performing motor skills in play and sport situations. These children must be identified early and appropriate remedial programmes provided for them.

The Need for a More Precise Definition

The term physically awkward seems to be as difficult to define as the broader term learning disability. Motor impairment may be seen as a specific learning disability, comprising a heterogeneous group with varying capabilities and needs. As much as six percent of school children experience serious difficulties in learning motor skills (Gubbay, 1975; Keogh, 1968). Researchers vary in their definition of physical awkwardness. Some include mental retardation, genetic and emotional disturbances as well as neural dysfunction in discussing the nature of children comprising this group. Some researchers describe these children as those who are unable to perform planned, purposeful and precise behaviour (Gubbay, 1975; Wall, 1981). A more precise definition of physical awkwardness should be useful in the identification of children with motor performance difficulties and their remediation. A more

accurate definition should also prevent inaccurate labelling. Labelling suggests the existence of a homogeneous group. For example, an impulsive or hyperactive child is not necessarily physically awkward. A child with motor performance difficulties may be wrongly accused of being 'lazy' or 'emotionally disturbed.' Since the first step in the identification process is to be able to properly define the group one is working with, a clear, precise definition would be an asset to the practitioner.

Physical Awkwardness - A Secondary Consideration

The nature and incidence of physical awkwardness in the general school population has not been described in a direct, systematic manner (Keogh et al, 1979). Most of the available information and ideas about the physically awkward have come from studies in which physical awkwardness was a secondary consideration. For example, in a study of 33 'troublesome' children, Stott (1966) found a high incidence of concomitant conditions which could be attributed to neural dysfunction. Keogh and Oliver (1967) made a clinical study of the extreme physical awkwardness of educationally mentally retarded young boys. Dare and Gordon (1970) studied 35 children referred to a neurological clinic due to visuo-motor disabilities. Of the 35 case studies, 4 children were found to have minor forms of cerebral palsy, 12 had low intelligence and 19 had a specific developmental disorder with average or even above average intelligence. In a validation of Stott's Test of motor impairment, Whiting, Clarke and Morris (1969), tested 108 children attending a paediatric clinic for any of a complete range of disorders. Therefore, the need for a study that contains an accurate criterion-referenced group is quite apparent.

Problems in Assessment

The identification of physically awkward children must involve an assessment of movement performance in relation to some general expectations of what is adequate motor proficiency. Many of the current motor assessment tests measure tasks with relatively low spatial-temporal task demands. As Wall (1981) has suggested, it is essential that test items should reflect an increase in information load as the child grows older and should be culturally-normative. At the present time, appropriate movement assessment procedures to identify physically awkward children do not exist (Lewko, 1976). Many gross-motor performance tests evaluate only the quantitative aspects of performance. Detailed and systematic observations are needed to identify the nature of a child's problems. Checklists can facilitate the realization of these objectives.

Checklists

Criteria for Effective Checklists

In order for a checklist to be effective, one of the most important factors to consider is its validity. In particular, the construct and ecological validity of checklist items must be examined. Checklists should also be tested for reliability and predictive value. Behavioural statements must be clear, precise and describe the criteria for successful performance (Mager, 1962; Popham & Baker, 1970). The measuring instrument should collect information needed for decision making so as to effectively differentiate between student abilities (Davis, Alexander & Yelon, 1974). As well as being good discriminators, checklist items

should be age-appropriate, practical and easily observable. In addition, checklists should tap a broad array of items related to the construct being measured, and take into account the social and physical environment of the children as they affect their motor performance.

To date, the most extensive use of checklists have been in the area of behaviour disorders. A review by Spivak and Swift (1973) critically analyzes 19 behavioural checklists consisting of overt classroom behaviour items. This critique provided insight into issues related to reliability, validity, and norms. The information discussed in this paper was useful in determining the effectiveness of existing motor skill checklists.

A number of checklists used for identifying motor performance difficulties are briefly discussed below.

One of the first checklists was designed for use in evaluating each of the movement patterns of an individual child (Godfrey and Kephart, 1969). Checklists are provided for each of the following movement patterns: walking, running, jumping, hopping, skipping, sliding, crawling, climbing, rolling, standing, throwing, catching, hitting, kicking, pushing, pulling, carrying and sitting. These movement patterns are evaluated according to particular criteria, and abilities as well as deviations are noted. This checklist may be used as a screening device and does purport to measure the qualitative aspects of movement.

Sugden (1972) designed a 29-item checklist for teachers to use for the purpose of identifying physically awkward children. Of the 29 items, 11 were related to classroom tasks, 8 to playground tasks and 10 to behaviour related to physical activities. Follow-up studies to the

Sugden (1972) study were done by Reynard (1975) and Calkins (1977). These studies were concerned with the identification of kindergarten children with motor performance difficulties and the consistency of different identification procedures. Sugden's teacher checklist was used as a screening device in both of the aforementioned studies. The results demonstrated that the different asessment procedures used did not identify the same physically awkward children. It may be that personal-social behaviours may confuse attempts to understand the nature of awkwardness. In fact, a follow-up study by Keogh et al (1979) demonstrated that some children with genuine movement problems may avoid movement by their disruptive behaviours; other children seem inappropriately identified as physically awkward because of their disruptive behaviours.

Gubbay (1975) also included social behaviours in his screening device. He developed a questionnaire for teachers to use in the selection of children who fall into the lowest range of motor performance. The questionnaire was comprised of 6 very general and somewhat vague items, leaving a great deal of inference to the teacher. For example, "Is the child unduly clumsy?" A well-defined criteria for successful performance might make this questionnaire easier to use.

Both the Ohio State University Scale of Intra-Gross Motor Assessment designed by Loovis (1975) and the DeOreo Fundamental Motor Skills Inventory (1976) have been critiqued by Herkowitz (1978). She concludes that both of these tests, although not well standardized, appear to be promising screening tests. The OSU Sigma was designed to assess the efficiency and maturity of preschool through 14-year-old children's performance on 11 selected gross motor skills: walking, catch

ing, ladder climbing, stair climbing, throwing, striking, skipping, running, hopping, jumping and kicking. It emphasizes the need to recognize the stage of efficient and mature motor skill acquisition, and acknowledges the great variability demonstrated by young children. The DFMSI was designed for use with preschool children and examines performance in 11 categories: striking, balancing, skipping, jumping, galloping, hopping, catching, running, climbing, throwing and kicking. It attempts to consider both process and product components and provides a means by which the age-appropriateness of performance can be assessed. Both assessment techniques seem to be easily usable in school settings by relatively untrained examiners.

In a study by Henderson and Hall (1981), the authors were primarily concerned with the efficiency of teachers in the identification of physically awkward children. The teachers did not use a checklist in the selection of students. Instead, children were chosen for the study based on criteria relating to motor behaviour and the degree to which motor impairment was affecting their school progress as determined by the classroom teacher. The teachers judgements were compared to the paediatrician's subjective judgement, the score on the neurodevelopmental scale and the scale on the motor impairment test. The results showed that the teacher's judgements matched very accurately those of a paediatric neurologist and a psychologist. However, the teachers were involved in several discussions of the issues relating to physical awkwardness over a period of a year which may have contributed to the accuracy of their observations.

The London Borough of Croyden Checklist (cited in Wedell & Raybould, 1976, p.118) is a screening device used primarily for the early identification of reading and learning difficulties. However, it does cover four areas, one of which is a section on perceptual-motor abilities. The five items chosen in this section are more related to paper and pencil type tasks. However, this checklist is now a routinely used test and does seem to serve the purpose of heightening teachers' awareness.

A study by Hicks et al (1981) used teacher and parent checklist ratings to assess learning-disabled, hyperactive, and emotionally disturbed children. The authors used an activity scale, learning scale and attitudinal scale in the ratings. The study showed that teacher ratings were more accurate than those of parents. Of the few studies reviewed, only four have made use of extensive checklists designed specifically for the identification of motor performance difficulties. These techniques have some potential as screening devices, although some problems do exist.

Problems Associated With Motor Checklists

Although some checklists appear to have good potential as screening instruments, data relevant to reliability, validity and norms are not present. In particular, tests are not ecologically valid, that is, items are not typical of sport and play activities and have little resemblance to school-type tasks (Reynard, 1975). In some cases, the researchers are not certain that the criterion group was, in fact, physically awkward. The specific tasks chosen as checklist items are sometimes more related to conduct behaviours rather than overt motor behaviours and therefore may not be easily observable. Also, conduct behavi-

ours may cause some confusion to teachers in identifying physically awkward children (Keogh et al, 1979). Items on checklists may not tap the major components within the motor domain. If this is the case, the instructor will not have enough information to establish an adequate profile of a child's motor performance abilities. In fact, some tests that purport to measure motor performance consist basically of paper and pencil tasks and only tap the fine motor domain. Items sometimes refer to general abilities and do not provide clear behavioural statements. If questions are too broad, a great deal of inference is left to the teacher. The lack of a specific criteria for performance may result in too few or too many children being chosen depending on the interpretation of the rater. In conjunction with this problem is the one of providing proper instructions to the teachers both in the use of the checklist and in relation to the reference group.

The present study attempted to deal with the issues related to reliability and validity. Also, subjects were selected from a well-defined criterion-referenced group. The items chosen for the checklist were culturally-normative with the intent of tapping the major components in the motor domain.

CHAPTER III

METHODOLOGY

Sample

The initial subject pool came from the IBM-University of Alberta Learning Disabilities Project and comprised all 8, 10 and 12-year-old children in grades 3, 5 and 7 of the Edmonton Catholic School Board. Of these children, those whose scores might be confounded due to deficiencies in intelligence or second language, and problems of an emotional or sensory nature were discarded. In addition, the reading disabled subjects had to demonstrate a severe lag in reading scores as determined by the Edmonton Catholic School Board screening process, and confirmed by the resource room teacher. Parent permission was the remaining determinant for inclusion in the subject pool for both samples.

Final selection of the control sample in the Learning-Disabilities Project was made from 10 schools and stratified equally for high, middle and low socio-economic level. The reading disabled children were chosen from all 52 schools in the system in order to acquire a sample which would meet the established criteria. An equal number of boys and girls were selected in each age classification.

Reading lag was determined by the Edmonton Catholic School Board, using a minimum of 1/3 behind expected reading score as a criterion for flagging children in the system. The sample for the Learning Disabilities study was then chosen from the children who displayed an additional -.5 lag between potential and actual reading scores, to ensure the selection of a clearly reading disabled group.

Selection of Physically Awkward and Control Children

The present study was concerned with the grade 3 and grade 5 reading disabled and control subjects in the Learning Disabilities Study; 89 in the former and 81 in the latter. A motor performance test battery adapted from the Stott Test of Motor Impairment (1972), Gubbays' Screening Test (1975), and a dodge run (Taylor, 1980) was the instrument used in determining the selection of subjects for the present study. The test battery consisted of 15 fine and gross-motor items (see Appendix A for description of motor items). If a child was below the 10th percentile in at least three of these items, he or she was considered to be a possible candidate for the physically awkward criterion group and a profile of their scores was charted. Of the 15 items, five were chosen as being most indicative of motor performance difficulties and examined more closely for the 8-year-olds. Six items were chosen for the 10-year-olds. A further profile was carried out on the selected children using the five or six gross-motor items chosen. If a child received scores on three items below the 10th percentile or two scores below the 10th percentile and the remaining scores were in the 20th and 30th percentiles he or she was considered to be physically awkward for the purposes of this study (See Appendix B for profile of gross motor items).

Control subjects were matched according to sex, grade and groups; that is, reading disabled or average readers. The scores of the control subjects had to be above the 50th percentile in most items and have an overall average of approximately 50 percent.

To prevent physically awkward subjects from being identified by the teacher and therefore biasing the rating, additional subjects were chosen as well as the controls. Teachers were asked to rate all the children in the class that were used in the IBM-U. of A. Learning Disabilities Project if there were five students or less involved. If there were more than five children in the class, then students were randomly selected in addition to the control or target subjects to a maximum of five.

The resulting number of subjects for the present study was as follows: 32 physically awkward children, 32 control subjects, and 38 randomly selected students.

Of the physically awkward subjects, 15 were from the third grade and consisted of eight male and seven females, 10 of whom were reading disabled. Seventeen were from the fifth grade and consisted of seven males and 10 females; nine of this group being reading disabled. (see Appendix B for further detail).

Development of the Checklist

Items selected were strictly overt motor activities requiring little or no inference from the rater. Theoretical trait designators such as agressiveness, impulsivity or hyperactivity were avoided. Another major criterion for inclusion in the checklist was that the item must be a functional or culturally-normative skill. In the present study, motor skills which were expected to be in the performance repertoire of a normal child aged 6-11-years were examined. Striking, catching, running, throwing, kicking, and balance skills are considered to be

culturally-normative. For this reason they comprise most of the content in the activity item section of the checklist, thereby contributing to the usefulness and ecological validity of the checklist as a screening device.

The overt motor tasks were derived from the narrative descriptions of six graduate students in the Adapted Programme of the Physical Education Department at the University of Alberta. Each student was asked to describe what type of activities or tasks best characterized the "Physically Awkward" child. These suggestions, as well as checklist items from other studies were considered. A review of the literature discussing developmental levels (Arnheim, 1975; McClenaghan & Gallahue, 1978) as well as case studies (Dare & Gorden, 1970; Reuben & Bakwin, 1968) were useful in determining the inclusion of many items. The result was an original item pool consisting of 93 overt motor tasks. These items were divided into three sections: 1) Sports (49 items) 2) Playground (18 items) and 3) classroom (26 items).

Items were then rated on a four-point scale by nine professionals to determine the clarity and age-appropriateness of each item (see Appendix C for Validity Check 1).

Following these ratings, items were eliminated on the following bases: a) There was not consensus among the raters that the item was a good one, b) the task was not easily observable, c) the frequency of occurrence of a particular item was too low to allow proper judgement, and d) items were considered to be too difficult to significantly differen-

tiate motor learning problems from the norm. In other words, too many children would be identified as being physically awkward.

As a result of these ratings, three checklists emerged, one for each age group. The sections within the checklist were also revised. Instead of three sections, the checklist was reduced to two: 1) activity items which were representative of typical play and game environments, and 2) classroom items consisting of fine motor skills.

The second stage in the development of the checklists resulted in 19 activity and 13 classroom items for the 6-7-year-olds, 30 activity and 16 classroom items for the 8-9-year-olds; and 31 activity and 15 classroom items for the 10-11-year-olds.

The third stage in the development of the checklist involved the rating of the items by eight consultants in the field of Physical Education. Items were rated for quality as a discriminator between physically awkward children and their normal peers. A scale of 1 to 4 was used to rate the items. (see Appendix D for Validity Check 2).

Items were eliminated on the basis of factors similar to those used in stage II of the checklist's development. In particular items focusing on directionality (knowing left from right side of body), were sex-biased (eg. skipping) or were dependent on the availability of special equipment (eg. trampoline) were considered as being inappropriate by the raters. Therefore, these items were excluded.

Stage III resulted in the final items selected. Although three checklists were developed, only two were used: one for the 8-9-year-old

age groups and one for the 10-11-year-old age groups. This was due to the fact that the criterion-group of physically awkward children was not identified at the younger age groups (see Appendix E for final checklists).

Instructions to the Teachers

The teachers were asked to rate the children using the motor behaviour checklist. A scale using five descriptors to rate performance was provided. They are as follows: 'very poorly,' 'poorly,' 'adequate,' 'well,' and 'very well.' Instructions to the teachers included a diagram illustrating each descriptor and its relation to the percentage of children who would perform at a particular level. Teachers were asked to judge the children on the basis of their past experience in order to determine what was 'adequate' performance (see Appendix F for Instructions to the Teachers).

Teachers were also asked to complete a questionnaire pertaining to their past experience and the ease of use of the instructions and checklist (see Appendix G for Teacher Questionnaire).

Analysis of the Data

The Kruskal-Wallace one-way analysis of variance by ranks corrected for ties was used to determine significant differences between the physically awkward and control groups at the grade 3 and 5 levels on each of the items in the gross-motor and fine-motor checklist.

To test for the internal consistency of the significant items on the checklist the Alpha Cronbach test of internal consistency was used with each age group.

CHAPTER IV

RESULTS AND DISCUSSION

The purpose of the study was to investigate the effectiveness of items on a motor performance checklist in differentiating between physically awkward children and their control counterparts. The ability of teachers to use the checklists at the grade 3 and grade 5 levels was also examined. Statistical analysis was performed on the checklist items as well as for the total scores received by subjects in both the physically awkward and control groups. This chapter presents the results of analysis and discusses the data obtained.

Results

Criterion groups of physically awkward children were identified on the basis of a profile analysis of the percentile scores from selected gross-motor items administered in the IBM-U of A Learning Disabilities Project. A summary of the profile analysis for the above physically awkward groups and their control counterparts at each grade is provided in Appendix B. Table 1 summarizes the sex, grade and group characteristics of the physically awkward subjects. Since control subjects were matched on sex, grade and reading ability, characteristics of this group would be similar to those of the physically awkward.

The profile analysis resulted in 15 children identified as being physically awkward from the grade 3 group and 17 in the grade 5 group. However, a loss of subjects in the study resulted in 12 physically awkward children and 14 controls for the grade 3's and 14 physically awkward and 13 controls for the grade 5's.

TABLE 1

Frequency of Physically Awkward Subjects in Each Grade

	GROUP		SEX		AGE
	RD	N	M	F	X
GRADE 3	10	5	8	7	8.79 Yr
GRADE 5	9	8	7	10	10.77 Yr

A Kruskal - Wallace one way analysis of variance by ranks was completed on the items in the gross-motor and fine-motor checklists for each grade comparing the scores of the criterion group of physically awkward children with those of the control group. Table 2 presents the results of the above analysis on the grade 3 gross-motor performance items. The teachers significantly differentiated the physically awkward group from the control groups on 16 of the 26 motor descriptors. Table 3 presents the results of the above analysis for the groups in grade 5; however, only 17 of 30 items were identified as being significantly different.

Table 4 summarizes the results of the Kruskal-Wallis one way analysis of variance by ranks corrected for ties for the fine-motor checklist items at the grade 3 level. These results show that teachers could not differentiate the physically awkward children from their control counterparts on any of the 13 motor descriptors. As summarized in Table 5, again the teachers were unable to differentiate the two groups

Table 2. Results of the Kruskal-Wallis One-Way Analysis of Variance by Ranks of the Ratings of the Activity Items for the Physically Awkward and Control Groups

Grade Three

			CORRECTED FOR TIES	
	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
1. The child executes a controlled gait while performing locomotor skills.	5.598	0.018	6.098	0.014
2. The child changes direction while running in an obstacle course without markedly changing pace.	5.598	0.018	6.091	0.014
3. The child performs an independent front roll (sommersault).	4.667	0.031	5.307	0.021
4. The child runs in a straight path for a distance of approximately 8 meters.	1.280	0.258	1.402	0.236
5. The child marches to a fast and/or slow beat.	3.820	0.051	4.265	0.039
6. The child keeps time to music when clapping.	3.622	0.057	3.928	0.047
7. The child jumps vertically with both feet simultaneously leaving the ground and lands without falling.	1.588	0.208	1.798	0.180
8. The child maneuvers over and between objects of varying heights in an obstacle course.	4.667	0.031	5.315	0.021

Grade Three Activities Items (Continued)

	CHI-SQUARE	SIGNIFICANCE	CORRECTED FOR TIES CHI-SQUARE	SIGNIGICANCE
9. The child keeps up to peers in running races.	6.747	0.009	7.277	0.007
10. The child walks on a low bench approximately 20 cm wide without falling.	1.399	0.237	1.557	0.212
11. The child performs co-ordinated jumping jacks.	1.006	0.316	1.120	0.290
12. The child imitates the movement of another as in demonstrations and mirroring activities.	4.024	0.045	4.814	0.028
13. The child remembers a sequence of movements in activities such as relay races.	0.017	0.898	0.018	0.892
14. The child catches a ball thrown 1 metre to either side of him or her.	5.357	0.021	5.791	0.016
15. The child bounces a 20 cm playground ball with one hand three times consecutively without losing it.	3.921	0.048	4.159	0.041
16. The child runs and kicks a ball without stopping before making contact with the ball.	4.233	0.040	4.630	0.031
17. The child throws a tennis ball underhand against the wall and catches it with two hands.	4.892	0.027	5.171	0.023
18. The child skips forward 3 metres.	0.095	0.758	0.101	0.750

Grade Three Activities Items (Continued)

	CHI-SQUARE	SIGNIFICANCE	CORRECTED FOR TIES CHI-SQUARE	CORRECTED FOR TIES SIGNIFICANCE
19. The child rides a two-wheeled bike.	1.788	0.181	1.963	0.161
20. The child generates a smooth pumping action with the legs while using playground swings.	0.677	0.411	0.737	0.391
21. The child jumps rope with two feet together for at least three consecutive skips.	0.0	1.000	0.0	1.000
22. The child hops through a hopscotch pattern without losing balance.	0.017	0.898	0.018	0.894
23. The child touches a tetherball as it moves around the pole.	3.622	0.057	4.334	0.037
24. The child drops the ball and kicks it before it hits the ground.	4.892	0.027	5.229	0.022
25. The child kicks the ball between goal posts.	3.058	0.080	3.511	0.061
26. The child can ice skate a distance of 25 metres.	1.399	0.237	1.491	0.222

Table 3. Results of the Kruskal-Wallis One-Way Analysis of Variance by Ranks of the Ratings of the Classroom Items for the Physically Awkward and Control Groups

Grade Three

			CORRECTED FOR TIES	
	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
1. The child moves around the classroom without bumping into things.	0.320	0.572	0.407	0.523
2. The child reproduces simple geometric shapes (squares, triangles, circles) with pencil and paper.	0.905	0.341	1.045	0.307
3. The child does up buttons.	0.024	0.877	0.044	0.834
4. The child manipulates zippers.	0.024	0.877	0.044	0.834
5. The child ties shoelaces in a bow.	0.066	0.797	0.122	0.727
6. The child folds paper into simple patterns (squares, rectangles, triangles).	0.024	0.877	0.028	0.867
7. The child turns the pages of a book.	0.214	0.643	0.354	0.552
8. The child sharpens a pencil (i.e., putting pencil into sharpener and turning handle).	0.024	0.877	0.051	0.822
9. The child uses an eraser.	0.381	0.537	0.637	0.425
10. The child manipulates small objects in table games such as checkers, snakes and ladders and monopoly.	0.595	0.440	0.835	0.361

Grade Three Classroom Items (Continued)

	CHI-SQUARE	SIGNIFICANCE	CORRECTED FOR TIES CHI-SQUARE	CORRECTED FOR TIES SIGNIFICANCE
11. When colouring, the child stays within the lines.	0.042	0.837	0.048	0.826
12. The child correctly holds a pencil for printing.	0.017	0.898	0.021	0.885
13. The child cuts paper with scissors.	0.112	0.738	0.148	0.701

Table 4. Results of the Kruskal-Wallis One-Way Analysis of Variance by Ranks of the Ratings of the Activity Items for the Physically Awkward and Control Groups

Grade Five

			CORRECTED FOR TIES	
	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
1. The child executes a controlled gait while performing locomotor skills.	1.592	0.207	1.938	0.164
2. The child changes direction while running through a simple obstacle course without markedly changing pace.	2.722	0.099	3.096	0.078
3. The child performs an independent front roll (somersault).	2.885	0.089	3.356	0.067
4. The child jumps vertically with both feet simultaneously leaving the ground and lands without falling.	2.049	0.152	2.302	0.129
5. The child maneuvers over and between objects of varying height in an obstacle course.	2.119	0.145	2.675	0.102
6. The child keeps up to peers during running races.	3.582	0.058	3.941	0.047
7. The child walks on a low beam 13 cm wide without falling off.	0.721	0.396	0.863	0.353
8. The child performs coordinated jumping jacks.	4.456	0.035	5.149	0.023
9. The child remembers a sequence of movements in activities such as relay races.	0.681	0.409	0.790	0.374

Grade Five Activities Items (Continued)

	CHI-SQUARE	SIGNIFICANCE	CORRECTED FOR TIES CHI-SQUARE	CORRECTED FOR TIES SIGNIFICANCE
10. The child can catch a ball thrown 1 metre to either the right or left side of him or her.	7.123	0.008	8.231	0.004
11. The child throws the ball in front of a moving teammate so that the ball can be received.	4.056	0.044	4.863	0.027
12. The child bounces a ball with one hand without losing it.	5.654	0.017	6.236	0.013
13. The child runs and kicks a ball without stopping before making contact with it. (eg. soccer ball)	6.245	0.012	6.719	0.010
14. The child throws a tennis ball underhand against the wall and catches it with two hands.	4.154	0.042	4.800	0.028
15. The child skips forward 5 metres.	6.367	0.012	7.023	0.008
16. The child rides a two-wheeled bike.	0.059	0.808	0.071	0.790
17. The child changes direction readily in a running game like tag.	5.313	0.021	6.279	0.012
18. The child catches a fly ball outside the diamond area in a game of softball.	5.202	0.023	5.718	0.017
19. The child jumps rope with two feet together for at least three consecutive skips.	0.311	0.577	0.369	0.544

Grade Five Activities Items (Continued)

	CHI-SQUARE	SIGNIFICANCE	CORRECTED FOR TIES CHI-SQUARE	CORRECTED FOR TIES SIGNIFICANCE
20. The child hops through a hopscotch pattern without losing balance.	0.260	0.610	0.293	0.588
21. The child can move away from the ball quickly in games like dodge ball.	3.311	0.069	3.631	0.057
22. The child strikes a tetherball as it moves around the pole.	0.029	0.865	0.039	0.843
23. The child performs in key positions such as goalie, forward or defenceman in soccer.	2.263	0.133	2.427	0.119
24. The child performs in key positions such as catcher, pitcher or first base in softball.	4.663	0.031	5.302	0.021
25. The child drops the ball and kicks it before it hits the ground.	3.674	0.055	4.333	0.037
26. The child can catch a softball using a glove from a distance of 15 metres.	3.137	0.077	3.508	0.061
27. The child can ice skate a distance of 25 metres.	2.337	0.126	2.747	0.097
28. The child can swim a distance of 25 metres.	0.001	0.981	0.001	0.979
29. The child kicks the ball between goal posts.	5.539	0.019	6.223	0.013
30. The child throws a frisbee to a partner.	6.994	0.008	7.842	0.005

Table 5. Results of the Kruskal-Wallis One-Way Analysis of Variance by Ranks of the Ratings of the Classroom Items for the Physically Awkward and Control Groups

Grade Five

			CORRECTED FOR TIES	
	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
1. The child deals cards with a reasonable degree of speed without dropping them.	2.564	0.109	3.297	0.069
2. The child moves around the classroom without bumping into things.	0.213	0.645	0.244	0.621
3. The child reproduces simple geometric patterns (i.e. squares, triangles, circles) with pencil and paper.	1.300	0.254	1.466	0.226
4. The child does up buttons.	0.071	0.790	0.083	0.773
5. The child ties shoelaces in a bow.	0.005	0.942	0.006	0.938
6. The child folds paper into simple patterns (i.e., squares, rectangles, triangles).	0.191	0.662	0.214	0.643
7. The child turns pages of a book.	0.085	0.771	0.105	0.746
8. The child sharpens a pencil (i.e., putting pencil into sharpener and turning handle).	0.015	0.903	0.018	0.894
9. The child uses an eraser.	0.038	0.846	0.045	0.832

Grade Five Classroom Items (Continued)

			CORRECTED FOR TIES	
	CHI-SQUARE	SIGNIFICANCE	CHI-SQUARE	SIGNIFICANCE
10. The child manipulates small objects in table games such as checkers, snakes and ladders and monopoly.	0.285	0.593	0.337	0.562
11. When colouring, the child stays within the lines.	0.806	0.369	0.900	0.343
12. The child correctly holds a pencil for writing.	1.089	0.297	1.225	0.268
13. The child cuts paper with scissors.	0.235	0.627	0.277	0.598

on any of the 13 rated items at the grade 5 level. A summary of the discriminating items from the checklists at both grade levels is included in Appendix H.

The results of the teacher ratings on the fine-motor items indicated that no further analysis was required; however, a Cronbach's Alpha test of internal consistency was conducted on the gross-motor checklist items for both grades 3 and 5. The 16 items at the grade 3 level produced an alpha of .91 and the 17 items in grade 5 produced an alpha of .95, indicating both of the revised checklists were highly internally consistent.

The background experience of the teachers with regards to years of teaching and number of Physical Education courses vary. They also reacted differently to the checklist after completing it (see Tables 6 & 7 for Results of Teacher Questionnaire).

Total scores for the physically awkward children and their control counterparts were calculated on the significantly differentiating motor items (see Appendix K for data on raw scores). The results are as follows: For the 16 items in the grade 3 groups, the physically awkward children received scores that totalled 571 with a mean of 47.58. The control subjects scored a total of 816 with a mean score of 62.76 out of a possible maximum of 80.

For the 17 items in the grade 5 group, the physically awkward children received scores that totalled 733 with a mean of 52.3. The control subjects scored a total of 863 with a mean score of 66.3 out of a possible maximum of 85.

Table 6

Results of Teacher Questionnaire
(Grade 3)

Teacher	P.E. Instr.	No. of P.E. Courses	Grade & Yrs. Teach	Min./ Subj.	Comments
1	No	None	1-2 2-1 3-2	--	Easy
2	No	--	--	--	--
3	Yes	1	--	--	Easy
4	Yes	--	3-6 4-1 5-1	--	Very Easy
5	No	--	1-1 3-3	Long	Very Difficult
6	No	--	2-2 3-2 7-3 8-3	5	Easy
7	No	--	3-4 4-2 5-5 6-2 7-2 8-2	5	Difficult
8	Yes	14	3-2 4-4 6-1	10	Very Easy
9	No	--	2-1 3-1 5-2	25	Easy
10	Yes	--	1-3 2-2 3-2 4-1	10	Very Easy

Table 6 (cont.)

Results of Teacher Questionnaire
(Grade 3)

Teacher	P.E. Instr.	No. of P.E. Courses	Grade & Yrs. Teach	Min./ Subj.	Comments
11	Yes	None	3-1	5-10	Easy
12	Yes	1	2-2 3-7 4-3	15	Easy
13	No	--	1-10 2-1 3-3	15-20	Difficult; Predicted Items; Resource Rm. Teach
14	No	--	1-13 2-5 3-3 6-2	--	Easy; Principle Teaches P.E. & Marked Activity Items
15	No	--	3-6 4-2 5-2 6-1	10	Difficult & Time Consuming; Would'nt Use It

Table 7

Results of Teacher Questionnaire (Grade 5)

Teacher	P.E. Instr.	No. of P.E. Courses	Grade & Yrs. Teach	Min./ Subj.	Comments
1	Yes	None	5-1	15	Easy
2	Yes	10	5-1 6-2 7-4 8-4	5	Very Easy
3	No	--	4-6 5-6 6-6 7-5	--	P.E. Teach Rated Activity Items
4	--	--	--	--	Principal Rated Kids ∴ Predicted Items
5	Yes	P.E. Major	5-8	30	Easy
6	Yes	None	4-1 5-6	30	Easy
7	Yes	None	5-3 6-7	15	Easy
8	Yes	2	4-7 5-3	10	Difficult; Predicted A Lot; Need More Time
9	Yes	None	5-1	--	Easy
10	Yes	None	4-14 5-8 6-3	15	Easy
11	Yes	5	1-2 3-1 4-1 5-1	15	Easy

Table 7 (cont.)

Results of Teacher Questionnaire
(Grade 5)

Teacher	P.E. Instr.	No. of P.E. Courses	Grade & Yrs. Teach	Min./ Subj.	Comments
12	No	--	3-1 5-1	--	Easy
13	No	2	5-8 6-2	15	Easy
14	No	--	5-1 6-5	30	Easy
15	Yes	1	2-1 3-3 4-2 5-5	30	Instruc-tions Easy Difficult To Use; Question Validity

Discussion

The learning disability literature claims a much higher incidence of males with learning difficulties than females. Lerner (1976) reported that the problem appears in boys 4 to 6 times more often than in girls. Learning disabilities as a predominantly male disorder, was confirmed in Norman and Zigmond's (1980) study. The male-to-female ratio was 3.7:1, a proportion similar to the 3:1 male-to-female ratio reported by Kirk and Elkins (1975).

This information suggests that the incidence of physical awkwardness, a specific learning disability, would also be higher in the male population. Many studies of motor performance use only male subjects which further proliferates this idea (Liemahn & Knapczyk, 1974; Oliver & Keogh, 1967; Rarick & Dobbins, 1975). Also, checklists that include social behaviours related to physical activities such as Sugden's (1972) influence the teachers rating. Disruptive behaviour, particularly among boys may be confused with poor motor performance (Keogh et al, 1979). At a recent conference on Theory and Research in Learning Disabilities, sponsored by I.B.M. Canada and the University of Alberta, 1980, Barbara Keogh disputed this point, claiming that there is not clear evidence confirming the higher proportion of males-to-females. She further states that there is no significant difference between the sexes. The results of the present study supports this viewpoint. Table 1 shows that the male-to-female ratio of physically awkward children at the grade 3 level is very similar, 8:7, while at the grade 5 level the proportion was 7:10. It is also interesting to note that the incidence of reading disabled children who are physically awkward was twice that

of the controls at the grade 3 level. There was no significant difference between the reading disabled and control groups at the grade 5 level.

A total of six physically awkward subjects and five controls were lost in the course of the study. It is felt that the teachers who did not complete the checklists or who failed to take the time to complete them properly may have been under the pressure of the end-of-term work load. There were also other studies occurring simultaneously.

The Kruskal-Wallace one-way analysis of variance by ranks found 16 items for the grade 3 children and 17 items for the grade 5 children significantly differentiated the physically awkward from their control counterparts. These results suggest that the significant items have the ability to discriminate the motor performance ability of the two groups and therefore should be a good screening device for identifying physically awkward children.

The nature of the items selected as being good discriminators is note-worthy. Many of these tasks were culturally-normative activities. For example, significant items for the grade 3's involved rhythm skills, running skills and play activities that included ball skills. Grade 5 items demonstrated an inclusion of activities related to spatial and temporal factors required in sport and game situations. Examples are as follows: running skills in 'tag' and 'dodge ball'; positional play such as catcher or pitcher; and ball skills such as throwing to a teammate, catching a fly ball or kicking a soccer ball. It could be that teachers are most experienced with these kinds of activities and have a clearer idea of how a child should be able to perform the task. Another inter-

esting observation is the fact that some of the differentiating gross-motor items on the checklist are similar to a few of the activities chosen on the motor performance test battery such as the ball skills (Stott, 1972) and the dodge run (Taylor, 1980).

Items not selected as differentiating between the groups usually included activities that were not readily observable. Examples are as follows: remembering a sequence of movements; jumping rope consecutively; or playing hopscotch without losing balance. The lack of equipment on school grounds such as swings and bikes may account for the difficulty in observing these activities. However, hitting a tetherball appeares to be a good activity that allowed a teacher to predict a child's striking ability.

The Kruskal-Wallis results on the fine-motor items indicate that teachers could not differentiate the physically awkward children from their control counterparts on any of the 13 motor descriptors for either the grade 3 or the grade 5 groups. There are two possible explanations to account for this occurrence. The first is the content validity of the fine-motor items. Although two content validity checks were made, the items were rated by Physical Education consultants. Many of these individuals have not spent a great deal of time in the classroom setting and, perhaps, were unsure of the appropriateness of the fine-motor tasks. On the other hand, the items may be appropriate and demonstrate the fact that physically awkward children do not necessarily have fine-motor difficulties. On the basis of the data collected, a definitive statement on this issue cannot be made at this time.

A Cronbach's alpha test of internal consistency produced an alpha of .91 for the significant items at the grade 3 level and an alpha of .95 at the grade 5 level. The high internal consistency suggests that each of the differentiating items in the checklist seem to be measuring the construct of physical awkwardness.

The alpha shows that the scores are consistent on all the items for each subject by an individual teacher's rating. However, the ratings of each teacher are not consistant for all subjects. Teacher error has not been accounted for. In some cases, the score may be more reflective of the teacher's judgement than of the child's physical ability. This may be due to the interpretation of the scale used in rating the items. It appears that not all the teachers scaled the items in the same manner. For example, instead of rating an item as being performed very poorly, or poorly, a physically awkward child was sometimes rated as demonstrating adequate performance. Item 14 on the original checklist in the grade 5 groups is a good example of this occurrence. In the physically awkward group, eight children were rated as performing adequately and six as performing well. The control group was rated much higher; three being scored as performing well and six as very well. Only four were scored as performing adequately. In spite of the relatively good scores in both groups, there was a significance of .042 between the groups. This does suggest, that the teachers did in fact, rate the children too high. It could be that teachers are hesitant to rate a child poorly. Perhaps, a different choice of words such as 'fair' instead of 'poor' would be more appropriate. Another explanation for the particular item just cited was that it is too easy. However, this same

item, 'the wall throw' occurred on the motor performance test battery and did appear to identify children that had difficulty in performing ball skills. This would provide additional evidence to back up the fact that teachers judgements varied in their interpretation of the descriptors.

Teachers' experience vary considerably (see Appendix J for results of Teacher Questionnaire). This would also affect the differences in their judgements. Not all the classroom teachers teach physical education. The non-physical education teachers would have more difficulty observing the activities and would therefore have to do more predicting. Some teachers have taken several physical education half courses and have been teaching their particular age groups for many years. Others have taken few, if any, physical education courses and may have been teaching for a short period of time. The more years of experience that an individual has had with the age group that he or she was rating would allow for a greater familiarity with the tasks and the nature of adequate performance.

It appears that teachers' experiences also influenced their reactions to the checklist after using it. At the grade 3 level, four out of 15 teachers found the checklist difficult to use. In each of the four cases, the teacher did not teach the Physical Education class. Of the 11 that did find it easy to use, six taught the Physical Education class. The remaining five teachers also expressed no difficulty in using the checklist. At the grade 5 level, two out of 16 teachers found the checklist difficult to use. In one instance, the teacher did not teach Physical Education. In the other, it was felt that more time was

needed to do the checklist fairly. Only three other teachers did not teach the Physical Education class. However, they also indicated that the checklist was relatively easy to use. The average time taken to rate each subject was 10 to 15 minutes. Usually, the teachers that found the checklist difficult to use, also took a much longer time to rate it; 20 to 30 minutes. However, the final checklist contains only those items that differentiate physical awkwardness; therefore it should take less time.

The information given in the teacher's questionnaire suggests that some of the criteria of a good checklist have been met; that is, it is easy to use, inexpensive, and require a minimal amount of time for completion.

Graphs indicating the individual total scores of the physically awkward and control subjects are illustrated in Appendix K. These graphs provide preliminary information on appropriate guidelines for determining which children are, in fact, physically awkward. Further use of the checklist is necessary to generate sufficient data to develop criterion cutoff points to effectively identify physically awkward children. Professional evaluation of the result of checklists should determine cutoff scores that will help in the identification of physically awkward children.

CHAPTER V

SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

Summary

The purpose of the study was to develop, implement, and evaluate a motor behaviour checklist consisting of overt culturally-normative motor tasks.

The development of the checklist involved two validity checks and resulted in 26 gross-motor items and 13 fine-motor items for the grade 3 group. The checklist for the grade 5 group consisted of 30 gross-motor items and 13 fine-motor items.

Checklists were given to teachers in the Edmonton Separate School System who teach those children in grades 3 and 5 who were identified as being physically awkward on a motor performance test battery and their control counterparts. An additional number of random subjects were chosen to eliminate bias. A Kruskal-Wallace one-way analysis of variance by ranks corrected for ties identified 16 gross- motor items as significantly differentiating between groups at the grade 3 level and 17 items at the grade 5 level. Analysis of the fine-motor items did not identify any of the items as being significant discriminators. Therefore, no further analysis was required. However, a Cronbach's Alpha test of internal consistency produced an alpha of .91 for the significant gross-motor items at the grade 3 level and an alpha of .95 at the grade 5 level, indicating that both of the revised checklists were highly internally consistant.

Results of a teacher questionnaire demonstrated that the instructions were easy to follow. The checklists appeared to be easy to use, required a minimum of time to complete and tapped a broad array of culturally-normative skills, thereby meeting some of the requirements of a good checklist.

Conclusions

An evaluation of the motor performance checklist and its implementation gives support to the following conclusions.

1) Sixteen of the gross-motor items at the grade 3 level and 17 at the grade 5 level were identified as being good discriminators and therefore capable of differentiating between groups.
2) Analysis of the fine-motor items did not result in any of the tasks being significant discriminators. Therefore, these items do not differentiate between the two groups.
3) The internal consistency of the significant gross-motor items was very high at both the grade 3 and grade 5 level: .91 and .95 respectively.
4) The results of the study demonstrate that teachers are capable of identifying physically awkward children by use of a motor performance checklist consisting of overt culturally-normative gross-motor items. In addition, most teachers found both the instructions and checklists easy to use.

Recommendations

The following recommendations are suggested for further research in the area of motor performance checklists.

1) A new scale for rating subjects on the checklists needs to be developed. It is felt that a new choice of words might help to prevent the wide degree of variance in rating the physically awkward children.

2) There is some questions with regards to the validity of the fine-motor items on the checklist. It is felt that future research involving classroom teachers for the validity checks on the fine-motor items would improve this aspect of the study.

3) It was not possible at this time to test for inter-observer reliability. A follow-up study would be helpful in providing this data. In the following school year, the grade 4 teachers would rate the previously tested grade 3 students. Similarly, the grade 6 teachers would rate the previously tested grade 5 children. Results from teachers for each year on the same students could be compared.

4) In the present study items wre eliminated that were sex-biased. However, it is felt that some of these items could be the best differentiating tasks. If sex-biased items are included, then instructions to the teachers should specify consideration of male or female skills when rating the tasks.

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APPENDIX A

MOTOR PERFORMANCE TEST BATTERY

Dodge Run

Board Balance I

Board Balance II

Jump With One Foot Landing

Lacing Board

Gubbay's Clap and Catch

Hitting Target

Catching off Wall

Stork Balance

Placing Pegs in Board

DODGE RUN

EQUIPMENT	5 traffic cones masking tape 8' tape measure gym floor 40' x 16' stop watch scoring sheet
LAY OUT	Course consists of 5 traffic cones placed as per diagram, on corners of 8' square. Each cone is outlined on the floor with tape so that if it is knocked over accurate replacement is possible. In addition the path is marked on the floor with masking tape to avoid confusion.
STARTING POSITION	Student stands in starting box. Student must wear running shoes.
TASK	On signal ready, go, the subject runs a weaving pattern to the outside of each cone. Tester stops the watch as subject passes the last cone. If subject traces incorrect path, trial is repeated.
TRIALS	Three
SCORING	Best time of 3 trials.

BOARD BALANCE I

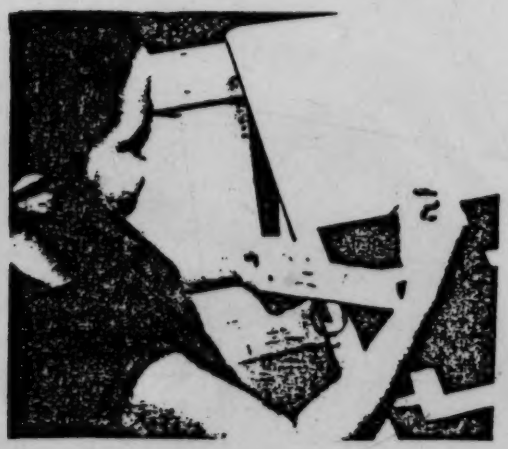
EQUIPMENT	Stop watch One balance board
PREPARATION	Subject must wear running (gym) shoes. The balancing board should be placed with the keel on the underside, away from walls and furniture. Tester must stand in front of and to the side of the subject so that the feet can be clearly observed.
TASK	Subject balances on the board on one leg. Tester may advise the subject to place his foot firmly on the middle of the board then raise the other foot gently. Tester should ensure that the subject is in the correct position before starting the stop watch.
TRIALS	Three for each leg.
SCORING	Discontinue timing after 10 seconds. Record time for each trial. Stop watch: If the standing leg is moved from the board. If the board tilts so that the sides of the board touch the floor. If the free leg touches the floor. If the subject cannot adopt the balancing position, assess score of 0.

BOARD BALANCE II

EQUIPMENT	Stop watch
	One balance board
PREPARATION	Subject must wear running (gym) shoes.
	The balance board must be placed with the keel uppermost, away from walls or furniture.
	Tester should stand in front of and to the side of the subject so that the feet can be clearly observed.
TASK	Subject balances on the keel on one leg. Tester may advise the subject to centre his foot firmly on the keel then lift the other foot gently.
	Tester should ensure that the subject is in the correct position before starting the stop watch.
	The task is repeated with the other leg.
TRIALS	Three for each leg.
SCORING	Discontinue timing after 14 seconds. Record time for each trial.
	Stop watch:
	If the standing leg is moved from the board.
	If the free leg touches the floor.
	If the subject cannot adopt the balancing position, assess score of 0.

JUMP WITH ONE FOOT LANDING

EQUIPMENT	Set of jumping stands
	Weighted cord
	Stop watch
PREPARATION	Tester measures subject's knee height from the floor to the lower border of the kneecap and places the cord on the pins at the same height. The pins should be on the far side of the child as he jumps to allow the cord to fall off without pulling down the stand.
	The jumping stands should be rather more than shoulder width apart.
TASK	Subject takes off with the feet together, jumps over the cord, and lands on one foot. Subject must remain on the landing foot for 5 seconds without the other foot touching the ground. (A minor adjustment of the landing foot is permitted.)
	Both feet are tested.
	The stop watch should be started when the subject lands.
TRIALS	Give three for each leg.
	Record time of each trial.
SCORING	Indicate failure and assess time of o:
	If subject does not take off with two feet toegther.
	If subject does not land on one foot and maintain the position for 5 seconds.
	If subject displaces the cord.



LACING BOARD

EQUIPMENT	Lacing board Lace Stop watch
LAY OUT	The subject takes the board in one hand. He holds the lace, which is quite separate from it, near the unknotted end ready for lacing.
TASK	On a signal the subject threads the lace back and forth through the holes, pulling it as far as it will go each time. The lace must not be wound round the edge of the board, but threaded straight in and out. The tester should demonstrate threading with one hand, and may remind the subject that this is easier, but he is not disqualified if he uses both hands.
TRIALS	Three

GUBBAY'S CLAP & CATCH

EQUIPMENT	Tennis ball Scoring grid on record sheet
PREPARATION	The starting position must be away from walls and furniture. Tester stands in front of and to the side of the subject.
TASK	Subject throws the ball into the air with preferred hand, and catches the ball cleanly in two hands. The ball must not be trapped against the body or clothing. Test to three trials or success, whichever comes first in the following categories. Discontinue testing with three consecutive failures.
TRIALS	a) Catch the ball with both hands. b) Catch the ball with both hands after 1 clap. c) Catch the ball with both hands after 2 claps. d) Catch the ball with both hands after 3 claps. e) Catch the ball with both hands after 4 claps. f) Catch the ball with preferred hand after 4 claps.
FAILURE	If ball is not caught in prescribed manner, or clap is not visible or audible before the ball is caught.

HITTING TARGET

EQUIPMENT	Tennis ball
	12" circular board
	Scoring grid on Record Sheet
LAY OUT	The target is hung on a wall at the height of the subject's chest with masking tape.
	The subject stands behind a chalked or taped line 10 feet away.
TASK	The subject throws the ball, either underarm or overarm, at the target with the preferred hand.
	The height of the target may be adjusted if the subject feels it is too high or too low.
	Only the preferred hand is tested.
	Success or failure should be entered on the grid after each attempt.
TRIALS	15. Do all of them. Give 2 practice trials.
SCORING	Record after each attempt. A throw is successful if any part of the target is hit. If any problems of style, or pattern of misses occurs, record on data sheet.

CATCHING OFF WALL

EQUIPMENT	Tennis ball Scoring grid on Record Sheet
STARTING POSITION	Subject stands facing a smooth wall at a distance of 8 feet. (mark with tape)
TASK	Subject throws the ball to hit the wall and catches it on the return with both hands. He must use an underarm throw. The ball must be caught clear of the body, not trapped against body or clothing. The tester should demonstrate the proper way to catch if the subject holds his hands too closed or too open, does not move his body or arms to meet the ball, or commits some other error of technique. The tester should also show the child that the ball must be thrown high enough to give a good rebound. Success or failure should be entered on the grid after each attempt.
TRIALS	15. Do all of them.

STORK BALANCE

EQUIPMENT	Stop watch
PREPARATION	Subject must wear running (gym) shoes. The starting position must be away from walls and furniture. Tester must stand in front of and to the side of the subject so that the feet can be observed clearly.
TASK	Subject stands on one foot and places the sole of the other foot against the side of the supporting knee. The hands are placed on the hips with the fingers facing forwards. Tester should ensure that subject is in the correct position before starting the stopwatch. The task is repeated with the other leg raised.
TRIALS	Three for each leg.
SCORING	Discontinue timing after 20 sec. Record time for each trial. Stop watch: If the standing leg is moved from the original position. If the free foot is moved from the inside of the knee. If the hands are removed from the hips. If the subject cannot adopt the balancing position, assess score of 0.

PLACING PEGS IN BOARD

EQUIPMENT	12-hole board Ten plastic pegs Plastic mat Stop watch
LAY OUT	The plastic mat is laid on a table with the board of holes placed in front of the subject. On the side of the subject's preferred hand the ten plastic pegs are laid out in a single row one inch apart. The row should be about three inches from the board. The pegs are subsequently laid out on the other side of the board for the non-preferred hand.
TASK	On a signal the subject, using one hand, places the pegs one at a time in the holes. He should be encouraged to steady the board with the other hand.
TRIALS	Three for each hand.

APPENDIX B

PROFILE OF GROSS-MOTOR ITEMS

Physically Awkward Subjects: Grade 3

Controls: Grade 3

Physically Awkward Subjects: Grade 5

Controls: Grade 5

GRADE 3
PROFILE OF GROSS-MOTOR ITEMS
CONTROL SUBJECTS

			ITEMS (PERCENTILES)					CRITERION PERCENTILE		
I.D.	GROUP	SEX	WALL THROW	GUBBAY	DODGE	BALANCE	JUMPING	10	20	30
139	N	M	38.2	12.8	53.1	61.7	55.3	0	1	0
182	N	M	72.3	63.8	44.7	89.4	51.0	0	0	0
317	RD	M	40.4	63.8	85.1	55.3	57.4	0	0	0
340	RD	M	91.5	87.2	89.4	42.5	78.7	0	0	0
341	RD	M	55.3	12.8	85.1	46.8	57.4	0	1	0
20	RD	M	40.4	12.8	95.7	63.8	57.4	0	1	0
168	RD	M	72.3	63.8	97.9	4.3	70.2	1	0	0
306	RD	M	63.8	46.8	70.2	40.2	29.8	0	0	0
326	N	F	45.2	92.8	71.4	59.5	0	1	0	0
174	N	F	88.1	92.8	50.0	19.0	59.5	0	1	0
330	N	F	23.8	76.2	88.1	33.3	85.7	0	0	1
285	RD	F	57.1	76.2	35.7	33.3	21.4	0	0	1
339	RD	F	69.0	47.6	42.9	64.3	26.1	0	0	1
373	RD	F	83.3	76.2	42.9	50.0	0	1	0	0
126	RD	F	66.7	21.4	88.1	14.3	45.2	0	1	1

RD-READING DISABLED
N- NONREADING DISABLED

GRADE 3
PROFILE OF GROSS-MOTOR ITEMS
PHYSICALLY AWKWARD SUBJECTS

			ITEMS (PERCENTILES)					CRITERION PERCENTILE		
I.D.	GROUP	SEX	WALL THROW	GUBBAY	DODGE	BALANCE	JUMPING	10	20	30
* 89	N	M	6.3	12.7	44.6	6.3	61.7	2	1	0
137	N	M	70.2	12.7	6.3	8.5	38.2	2	1	0
*181	N	M	27.7	12.7	10.6	40.4	0	2	1	1
*311	RD	M	19.1	46.8	63.8	14.8	0	1	2	0
*312	RD	M	40.4	12.7	93.6	10.6	0	2	1	0
* 2	RD	M	0	4.25	8.5	0	0	5	0	0
1	RD	M	27.6	12.7	53.9	8.5	29.7	1	1	2
* 14	RD	M	40.4	12.7	14.8	0	0	2	2	0
* 36	RD	M	23.4	12.7	40.4	6.3	0	2	1	1
*308	RD	M	6.3	0	36.1	72.3	0	3	0	0
284	RD	M	14.8	63.8	74.4	2.1	0	2	1	0
*135	N	F	45.2	47.6	9.5	11.9	0	2	1	0
*177	N	F	0	47.6	30.9	2.3	21.4	2	1	1
328	N	F	23.8	47.6	33.3	4.7	45.2	1	0	1
*331	N	F	14.2	47.6	2.3	64.2	0	2	1	0
*318	RD	F	69.0	11.9	7.1	0	0	3	1	0
* 29	RD	F	0	0	54.7	26.1	0	3	0	1
* 54	RD	F	0	11.9	54.7	52.3	19.0	1	2	0
*207	RD	F	0	11.9	0	4.7	0	4	1	0

RD-READING DISABLED
N- NONREADING DISABLED

* PHYSICALLY AWKWARD SUBJECTS

GRADE 5
PROFILE OF GROSS-MOTOR ITEMS
PHYSICALLY AWKWARD SUBJECTS

			ITEMS (PERCENTILES)						CRITERION PERCENTILE		
I.D.	SEX	GROUP	WALL THROW	GUBBAY	DODGE	STORK	BALANCE	JUMPING	10	20	30
*115	M	N	0	0	0	0	0	0	6	0	0
* 77	M	N	17.0	12.9	31.7	7.3	4.8	31.7	2	2	0
*237	M	N	70.7	0	9.7	43.9	0	0	4	0	0
* 57	M	RD	2.4	0	24.3	12.1	24.3	0	3	1	2
*365	M	RD	41.4	14.6	56.0	0	51.2	0	2	1	0
276	M	RD	31.7	14.6	34.1	39.0	2.4	12.1	1	2	0
*353	M	RD	12.1	0	4.8	9.7	9.7	0	5	1	0
*368	M	RD	7.3	14.6	34.1	21.9	17.7	0	2	2	1
*106	F	N	40.0	12.5	20.0	0	12.5	0	2	3	0
*105	F	N	57.5	12.5	25.0	12.5	0	10.0	2	2	1
*102	F	N	0	2.5	0	7.5	62.5	0	5	0	0
*107	F	N	7.5	32.5	15.0	52.5	5.0	0	3	1	0
70	F	N	57.5	60.0	2.5	27.5	22.5	0	2	0	2
*193	F	N	32.5	0	10.0	20.0	40.0	10.0	3	1	0
*147	F	RD	2.5	12.5	57.5	17.5	15.0	10.0	2	3	0
*145	F	RD	5.0	32.5	40.0	12.5	7.5	12.5	2	2	0
*364	F	RD	12.5	12.5	30.0	7.5	10.0	10.0	3	2	1
*302	F	RD	22.5	60.0	22.5	45.0	10.0	0	2	0	2
*160	F	RD	10.0	2.5	67.5	2.5	5.0	0	5	0	0

RD-READING DISABLED
N -NONREADING DISABLED

*PHYSICALLY AWKWARD
SUBJECTS

GRADE 5
PROFILE OF GROSS-MOTOR ITEMS
CONTROL SUBJECTS

			ITEMS (PERCENTILES)						CRITERION PERCENTILE		
I.D.	GROUP	SEX	WALL THROW	GUEBAY	DODGE	STORK	BALANCE	JUMPING	10	20	30
114	N	M	70.7	43.9	78.1	2.4	31.7	58.5	1	0	0
78	N	M	58.5	43.9	80.5	56.1	56.1	34.1	0	1	0
240	N	M	70.7	43.9	65.9	60.9	41.5	58.5	0	0	0
146	RD	M	70.7	43.9	58.5	58.5	75.6	31.7	0	0	0
360	RD	M	58.5	43.9	58.5	58.5	46.3	0	1	0	0
4	RD	M	31.7	14.6	65.9	34.1	60.9	58.5	0	1	0
348	RD	M	41.5	43.9	80.5	4.8	60.9	53.7	1	0	0
102	N	F	40.0	60.0	70.0	52.5	67.5	0	1	0	0
68	N	F	92.5	60.0	82.5	15.0	70.0	70.0	0	1	0
73	N	F	67.5	60.0	32.5	10.0	52.5	32.5	1	0	0
71	N	F	67.5	60.0	47.5	22.5	42.5	67.5	0	0	1
72	N	F	57.5	32.5	72.5	35.0	45.0	57.5	0	0	0
275	RD	F	92.5	60.0	95.0	37.5	72.5	30.0	0	0	1
303	RD	F	92.5	60.0	45.0	22.5	67.5	10.0	1	0	2
361	RD	F	12.5	2.5	90.0	47.5	40.0	55.0	1	1	0
300	RD	F	67.5	60.0	87.5	52.5	72.5	40.0	0	0	0
287	RD	F	12.5	60.0	55.0	52.5	32.5	75.0	0	1	0

RD-READING DISABLED
N -NONREADING DISABLED

APPENDIX C

VALIDITY CHECK 1

A Checklist for Determining Physically Awkward Children

Your assistance is needed in determining the clarity of wording and comprehensibility of the tasks selected in the following checklist. Your judgement in assessing the appropriateness of each item to be used for each age group will also be helpful.

Please use the following scale to rate: (1) the clarity of the item and (2) the appropriateness for each age group.

Very Good	4
Good	3
Fair	2
Poor	1

Example:

		Ages		
Items	Clarity	6-7	8-9	10-11
1	3	4	3	3
2				
3				

NOTE: An item may be very appropriate for every age group. On the other hand a task may be suitable for the 6-7 year olds but too easy for the other two groups.

Please return to Ellen Umansky as soon as possible.

Note to the evaluator:

Please set aside one hour of your time to complete this task. In order to standardize the setting for each rater the following conditions are recommended:

(a) choose a place to work that is quiet and free of distractions;

(b) a time of day when you are most alert;

(c) a time when you can put all of your attention on the task;

(d) try and choose a time that allows you to analyze the items thoughtfully and slowly.

Thank you.

Items - SPORTS	Clarity	6-7	8-9	10-11
1. The child can demonstrate a controlled gait and good posture while performing locomotor skills.				
2. The child can skip rope hopping alternately from one foot to the other.				
3. The child can change direction through a simple obstacle course without stopping or significantly changing pace.				
4. The child can perform a front roll.				
5. The child can estimate the height of an object and size of steps needed to clear it in jumping and hurdling activities.				
6. The child can follow directions in games like "Simon Says".				
7. The child can compete in game situations while still maintaining his/her optimal skill level.				
8. The child can perform symmetrical movements in gymnastics (using two sides of the body simultaneously) such as forward rolls.				
9. The child can run a straight track for a short distance without difficulty.				
10. The child can exhibit rhythmic coordination to a simple beat (ie., marching to a record or musical instrument).				
11. The child can keep time to music by clapping.				
12. The child can comprehend simple rules of group games.				
13. The child can exhibit bodily control and balance while performing the long jump.				
14. The child can jump with both feet simultaneously leaving the ground and land with body control.				

Items - SPORTS	Clarity	6-7	8-9	10-11
15. The child can step over and between objects of varying heights in an obstacle course.				
16. The child can comprehend the rules of games such as touch football, soccer or baseball.				
17. The child can demonstrate positional play in team sports like soccer.				
18. The child can maintain balance in locomotor skills such as running, hopping, jumping and leaping.				
19. The child can maintain balance while walking on a low bench or beam.				
20. The child can demonstrate good distribution of weight while bouncing on a trampoline.				
21. The child can demonstrate good rhythmic ability and coordination while bouncing on the trampoline.				
22. The child can perform a seat drop and bounce back to feet while on the trampoline.				
23. A child can perform jumping jacks rhythmically and with good coordination.				
24. A child can copy the actions of a partner in leading and following activities.				
25. A child can perform a log roll.				
26. A child can determine the appropriate amount of strength to apply when gripping a racket.				
27. A child can maintain good posture while walking with a bean bag on his/her head.				
28. A child can participate in games requiring endurance without tiring easily.				

Items - SPORTS	Clarity	6-7	8-9	10-11
29. The child can perform the correct action after a command.				
30. The child can remember commands that are sequential in nature in activities such as relay races.				
31. The child can move laterally to intercept a ball thrown to either side of him.				
32. The child can move backward and to the side in order to catch a ball.				
33. The child can follow directions of right and left without looking to other children for cues.				
34. The child can judge how far ahead of a person the ball should be thrown so that the ball and the person meet.				
35. The child can repeatedly bounce a ball with control using one hand.				
36. The child can run and kick a ball without stopping before making contact.				
37. The child can drop the ball and kick it before it hits the ground.				
38. The child can kick the ball with consistant accuracy at a stable target.				
39. The child can kick the ball between goal posts.				
40. The child can kick the ball with consistant accuracy at a moving target.				
41. The child can throw a ball with consistant accuracy at a stable target.				
42. The child can throw a ball with consistant accuracy at a moving target.				
43. The child can throw a ball against the wall and catch it with two hands.				

Items - SPORTS	Clarity	6-7	8-9	10-11
44. The child can throw a ball against the wall and catch it with one hand.				
45. The child can throw a ball accurately into a box or basket.				
46. The child can throw a ball over a bar on a net.				
47. The child can make contact with an object in striking activities such as racket sports, hockey or baseball.				
48. The child can hit a ball that is placed on a stable object such as a traffic cone with a bat.				
49. The child can receive a pass in a game of floor hockey.				

Items - PLAYGROUND	Clarity	6-7	8-9	10-11
1. The child can keep play within the boundaries during games (i.e., does not overrun boundaries).				
2. The child can use climbing apparatus appropriately				
3. The child can climb the ladder of a slide easily.				
4. The child can skip forward 15 feet.				
5. The child can ride a two-wheeled bike with control.				
6. The child can change direction readily in a running game like tag.				
7. The child can coordinate a smooth pumping action with the legs while using playground swings.				
8. The child can jump rope smoothly with two feet together.				
9. The child can turn the rope smoothly for others during skipping games.				
10. The child can maintain good balance while playing games like hop scotch.				
11. The child can handle activities that test his ability.				
12. The child can anticipate when and where to move in games like dodge ball.				
13. The child can perform well in key positions such as goalie in soccer; catcher, pitcher or first base in softball.				
14. The child can participate actively in games without demonstrating proneness to injury.				
15. The child can throw a frisbee effectively to a partner.				
16. The child can effectively shoot a marble at a chosen target.				
17. The child can touch or hit a tetherball as it moves.				
18. The child can keep up to his peers during running races.				

Items - CLASSROOM	Clarity	6-7	8-9	10-11
1. The child can dot i's and cross t's appropriately.				
2. The child can demonstrate the use of a clearly preferred hand for fine motor activities.				
3. The child can deal cards with a reasonable degree of speed without dropping them.				
4. The child can move around the classroom without bumping into things.				
5. The child can judge distances accurately when reaching for objects.				
6. The child can reproduce a simple pattern or design with pencil and paper.				
7. The child can copy a long word accurately.				
8. The child can put shoes on left and right foot correctly.				
9. The child can do up buttons and zippers efficiently.				
10. The child can lace shoes.				
11. The child can tie a single shoelace in a bow.				
12. The child can fold paper into simple patterns.				
13. The child can turn the pages of a book easily.				
14. The child can sharpen a pencil with a minimum of difficulty (i.e., putting pencil into sharpener and turning handle).				
15. The child can use an eraser properly.				
16. The child can use clay, paints, glue and other art materials without spilling or getting unusually dirty.				
17. The child can manipulate objects in table games such as checkers, snakes and ladders or tiddly winks.				

Items - CLASSROOM	Clarity	6-7	8-9	10-11
18. The child can locate directions in the room or in the school.				
19. The child can follow dotted or indicated lines.				
20. The child can write neatly with letters kept between the lines.				
21. The child can stay within outlines when drawing.				
22. The child can apply an appropriate amount of pressure when using pencils or crayons.				
23. The child can hold a pencil correctly for use in writing or drawing.				
24. The child can complete written assignments in a reasonable amount of time.				
25. The child can manipulate small utensils such as scissors, crayons and paint brushes.				
26. The child can get in and out of a desk easily.				

APPENDIX D

VALIDITY CHECK II

THE UNIVERSITY OF ALBERTA
FACULTY OF PHYSICAL EDUCATION AND RECREATION
OFFICE OF THE DEAN

Dear

I would appreciate it if you could help us in the development of a checklist for identifying physically awkward children. I have included the checklist and the instructions that teachers would receive for using it. Please read those instructions first in order to put the checklist's use into perspective. Then we would appreciate it if you would evaluate the quality of the items that have been included for each age group. We are especially interested in your evaluation of the age-appropriateness of each item and whether you feel it would discriminate between physically awkward children and their normal peers.

Please keep in mind that we are trying to identify children that represent the lower range of ability regarding motor performance. Therefore, items that appear to be too easy may be good indicators that the child has a problem. Would you please use the following scale to rate each item:

Very Good	4
Good	3
Fair	2
Poor	1

Thank-you for your assistance. We appreciate you taking this time to complete this checklist.

Please return to :

Ellen Umansky
Faculty of Physical Education and Recreation
University of Alberta
Edmonton, Alberta
T6G 2H9

Checklist for Identifying Physically Awkward Children

6 - 7 Year Olds

ACTIVITY ITEMS	Quality of Item
1. The child demonstrates a controlled gait while performing locomotor skills.	
2. The child changes direction through a simple obstacle course without markedly changing pace.	
3. The child follows directions in "Simon Says".	
4. The child runs in a straight line for a distance of approximately 8 meters.	
5. The child marches to a fast and/or slow beat.	
6. The child keeps time to music when clapping.	
7. The child jumps forward over a 15 cm wide line marked on the floor keeping two feet together.	
8. The child jumps backward over a 15 cm wide line marked on the floor keeping two feet together.	
9. The child steps over a knee-high obstacle without knocking it over.	
10. The child ducks under a shoulder-high obstacle without disturbing it.	
11. The child maintains body control in locomotor skills such as running, hopping and jumping.	
12. The child maintains balance while walking on a low bench approximately 20 cm wide.	
13. The child imitates the movement of another as in demonstrations and mirroring activities.	
14. The child performs a log roll (rolling over on the floor with the body stretched out).	
15. The child kicks a stationary ball.	
16. The child throws a 20 cm playground ball to the wall underhand and catches it after one bounce with two hands.	

6 - 7 Year Olds

ACTIVITY ITEMS	Quality of Item
17. The child catches a tossed 20 cm playground ball at waist level with two hands.	
18. The child bounces a 20 cm playground ball on the ground and catches it with two hands.	
19. The child climbs a ladder using alternate hand-foot sequence.	

6 - 7 Year Olds

CLASSROOM ITEMS	Quality of Item
1. The child moves around the room without bumping into things.	
2. The child reproduces simple geometric shapes (i.e. squares, triangles, circles) with pencil and paper.	
3. The child correctly puts shoes on the right and left foot.	
4. The child does up buttons independently.	
5. The child manipulates zippers.	
6. The child laces shoes.	
7. The child turn the pages of a book.	
8. The child sharpens a pencil (i.e., putting pencil into sharpener and turning handle).	
9. The child uses an eraser.	
10. The child manipulates small objects in table games such as checkers, snakes and ladders and monopoly.	
11. The child applies an appropriate amount of pressure when using pencils or crayons.	
12. The child holds a pencil for printing.	
13. The child cuts paper with scissors.	

8 - 9 Year Olds

ACTIVITY ITEMS	Quality of Item
1. The child executes a controlled gait while performing locomotor skills.	
2. The child skips rope hopping alternately from one foot to the other.	
3. The child changes direction in an obstacle course without markedly changing pace.	
4. The child performs an independent front roll (sommersault).	
5. The child follows directions in "Simon Says".	
6. The child runs in a straight line for a distance of approximately 8 meters.	
7. The child marches to a fast and/or slow beat.	
8. The child keeps time to music when clapping.	
9. The child jumps vertically with both feet simultaneously leaving the ground and lands with body control.	
10. The child maneuvers over and between objects of varying heights in an obstacle course.	
11. The child maintains body control in locomotor skills such as running, hopping and jumping.	
12. The child maintains balance while walking on a low bench approximately 20 cm wide.	
13. The child maintains body control while bouncing on the trampoline.	
14. The child performs a seat drop and bounces back to standing position on the trampoline.	
15. The child performs co-ordinated jumping jacks.	
16. The child imitates the movement of another as in demonstrations and mirroring activities.	
17. The child remembers a sequence of movements in activities such as relay races.	

8 - 9 Year Olds

ACTIVITY ITEMS	Quality of Item
18. The child catches a ball thrown to either side of him or her.	
19. The child follows directions of right and left without looking to other children for clues.	
20. The child bounces a 20 cm playground ball three times consecutively.	
21. The child runs and kicks a ball without stopping before making contact with the ball.	
22. The child throws a tennis ball underhand against the wall and catches it with two hands.	
23. The child hits a 10 cm ball that is placed on a stable object such as a traffic cone with a regular softball bat.	
24. The child skips forward 15 feet.	
25. The child rides a two-wheeled bike.	
26. The child generates a smooth pumping action with the legs while using playground swings.	
27. The child jumps rope with two feet together for at least three consecutive skips.	
28. The child turns the rope smoothly for others during skipping games.	
29. The child hops through a hopscotch pattern.	
30. The child touches a tetherball as it moves.	

8 - 9 Year Olds

CLASSROOM ITEMS	Quality of Item
1. The child deals cards with a reasonable degree of speed without dropping them.	
2. The child moves around the classroom without bumping into things.	
3. The child reproduces simple geometric shapes (squares, triangles, circles) with pencil and paper.	
4. The child does up buttons.	
5. The child manipulates zippers.	
6. The child ties shoelaces in a bow.	
7. The child folds paper into simple patters (squares, rectangles, triangles).	
8. The child turns the pages of a book.	
9. The child sharpens a pencil (i.e., putting pencil into sharpener and turning handle).	
10. The child uses an eraser.	
11. The child manipulates small objects in table games such as checkers, snakes and ladders and monopoly.	
12. The child locates directions in the room or in the school.	
13. When colouring, the child stays within the lines.	
14. The child applies an appropriate amount of pressure when using pencils or crayons.	
15. The child correctly holds a pencil for printing.	
16. The child cuts paper with scissors.	

10 - 11 Year Olds

ACTIVITY ITEMS	Quality of Item
1. The child executes a controlled gait while performing locomotor skills.	
2. The child skips rope hopping alternately from one foot to the other.	
3. The child changes direction through a simple obstacle course without markedly changing pace.	
4. The child performs an independent front roll (sommersault).	
5. The child follows directions in "Simon Says".	
6. The child jumps vertically with both feet simultaneously leaving the ground and lands with body control.	
7. The child maneuvers over and between objects of varying height in an obstacle course.	
8. The child maintains body control in locomotor skills such as running, hopping and jumping.	
9. The child maintains balance while walking on a low beam 13 cm wide.	
10. The child maintains body control while bouncing on a trampoline.	
11. The child performs a seat drop and bounces back to standing position while on the trampoline.	
12. The child performs coordinated jumping jacks.	
13. The child remembers a sequence of movements in activities such as relay races.	
14. The child moves in any direction to catch a ball.	
15. The child follows directions of right and left without looking to other children for cues.	
16. The child judges how far ahead of a person the ball should be thrown so that the person can easily catch the ball.	

10 - 11 Year Olds

ACTIVITY ITEMS	Quality of Item
17. The child maintains adequate ball control while repeatedly bouncing it wih one hand.	
18. The child runs and kicks a ball without stopping before making contact with it.	
19. The child drops a soccer ball and kicks it before it hits the ground.	
20. The child throws a tennis ball underhand against the wall and catches it with two hands.	
21. The child throws a tennis ball against the wall and catches it with one hand.	
22. The child hits a 10 cm ball that is placed on a stable object such as a traffic cone with a regular softball bat.	
23. The child skips forward 15 feet.	
24. The child rides a two-wheeled bike.	
25. The child changes direction readily in a running game like tag.	
26. The child generates a smooth pumping action with the legs while using playground swings.	
27. The child jumps rope with two feet together for at least three consecutive skips.	
28. The child turns the rope smoothly for others during skipping games.	
29. The child hops through a hopscotch pattern.	
30. The child anticipates when and where to move in games like dodge ball.	
31. The child touches a tetherball as it moves.	

10 - 11 Year Olds

CLASSROOM ITEMS	Quality of Item
1. The child deals cards with a reasonable degree of speed without dropping them.	
2. The child moves around the classroom without bumping into things.	
3. The child reproduces simple geometric patterns (i.e. squares, triangles, circles) with pencil and paper.	
4. The child does up buttons.	
5. The child ties shoelaces in a bow.	
6. The child folds paper into simple patterns (i.e., squares, rectangles, triangles).	
7. The child turns pages of a book	
8. The child sharpens a pencil (i.e., putting pencil into sharpener and turning handle).	
9. The child uses an eraser.	
10. The child manipulates small objects in table games such as checkers, snakes and ladders and monopoly.	
11. The child locates directions in the room or in the school.	
12. When colouring, the child stays within the lines.	
13. The child applies an appropriate amount of pressure when using pencils or crayons.	
14. The child correctly holds a pencil for writing.	
15. The child cuts paper with scissors.	

APPENDIX E

FINAL CHECKLISTS

Checklist for Identifying Physically Awkward Children

6 - 7 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
1. The child demonstrates a controlled gait while performing locomotor skills.						
2. The child runs in a straight path for a distance of approximately 8 meters.						
3. The child marches to a fast and/or slow beat.						
4. The child keeps time to music when clapping.						
5. The child jumps forward over a 15 cm wide line marked on the floor keeping two feet together.						
6. The child steps over a knee-high obstacle without knocking it over.						
7. The child ducks under a shoulder-high obstacle without disturbing it.						
8. The child walks on a low bench approximately 20 cm wide without falling.						
9. The child imitates the movement of another as in demonstrations and mirroring activities.						

6 - 7 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
10. The child performs a log roll (rolling over on the floor with the body stretched out).						
11. The child kicks a stationary ball.						
12. The child throws a 20 cm playground ball to the wall underhand and catches it after one bounce with two hands.						
13. The child catches a tossed 20 cm playground ball at waist level with two hands.						
14. The child bounces a 20 cm playground ball on the ground and catches it with two hands.						
15. The child climbs a ladder using alternate hand-foot sequence.						

6 - 7 Year Olds

CLASSROOM ITEMS	very poorly	poorly	adequately	well	very well	prediction
1. The child moves around the room without bumping into things.						
2. The child does up buttons independently.						
3. The child manipulates zippers.						
4. The child laces shoes.						
5. The child turn the pages of a book.						
6. The child sharpens a pencil (i.e., putting pencil into sharpener and turning handle).						
7. The child uses an eraser.						
8. The child manipulates small objects in table games such as checkers, snakes and ladders and monopoly.						
9. The child holds a pencil for printing.						
10. The child cuts paper with scissors.						

8 - 9 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
1. The child executes a controlled gait while performing locomotor skills.						
2. The child changes direction while running in an obstacle course without markedly changing pace.						
3. The child performs an independent front roll (sommersault).						
4. The child runs in a straight path for a distance of approximately 8 meters.						
5. The child marches to a fast and/or slow beat.						
6. The child keeps time to music when clapping.						
7. The child jumps vertically with both feet simultaneously leaving the ground and lands without falling.						
8. The child maneuvers over and between objects of varying heights in an obstacle course.						
9. The child keeps up to peers in running races.						

8 - 9 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
10. The child walks on a low bench approximately 20 cm wide without falling.						
11. The child performs co-ordinated jumping jacks.						
12. The child imitates the movement of another as in demonstrations and mirroring activities.						
13. The child remembers a sequence of movements in activities such as relay races.						
14. The child catches a ball thrown 1 metre to either side of him or her.						
15. The child bounces a 20 cm playground ball with one hand three times consecutively without losing it.						
16. The child runs and kicks a ball without stopping before making contact with the ball.						
17. The child throws a tennis ball underhand against the wall and catches it with two hands.						

8 - 9 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
18. The child skips forward 15 feet.						
19. The child rides a two-wheeled bike.						
20. The child generates a smooth pumping action with the legs while using playground swings.						
21. The child jumps rope with two feet together for at least three consecutive skips.						
22. The child hops through a hopscotch pattern without losing balance.						
23. The child touches a tetherball as it moves around the pole.						
24. The child drops the ball and kicks it before it hits the ground.						
25. The child kicks the ball between goal posts.						
26. The child can ice skate a distance of 25 metres.						

8 - 9 Year Olds

CLASSROOM ITEMS	very poorly	poorly	adequately	well	very well	prediction
1. The child moves around the classroom without bumping into things.						
2. The child reproduces simple geometric shapes (squares, triangles, circles) with pencil and paper.						
3. The child does up buttons.						
4. The child manipulates zippers.						
5. The child ties shoelaces in a bow.						
6. The child folds paper into simple patterns (squares, rectangles, triangles).						
7. The child turns the pages of a book.						
8. The child sharpens a pencil (i.e., putting pencil into sharpener and turning handle).						
9. The child uses an eraser.						
10. The child manipulates small objects in table games such as checkers, snakes and ladders and monopoly.						
11. When colouring, the child stays within the lines.						

8 - 9 Year Olds

CLASSROOM ITEMS	very poorly	poorly	adequately	well	very well	prediction
12. The child correctly holds a pencil for printing.						
13. The child cuts paper with scissors.						

10 - 11 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
1. The child executes a controlled gait while performing locomotor skills.						
2. The child changes direction while running through a simple obstacle course without markedly changing pace.						
3. The child performs an independent front roll (sommersault).						
4. The child jumps vertically with both feet simultaneously leaving the ground and lands without falling.						
5. The child maneuvers over and between objects of varying height in an obstacle course.						
6. The child keeps up to peers during running races.						
7. The child walks on a low beam 13 cm wide without falling off.						
8. The child performs coordinated jumping jacks.						
9. The child remembers a sequence of movements in activities such as relay races.						

10 - 11 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
10. The child can catch a ball thrown 1 metre to either the right or left side of him or her.						
11. The child throws the ball in front of a moving teammate so that the ball can be received.						
12. The child bounces a ball with one hand without losing it.						
13. The child runs and kicks a ball without stopping before making contact with it. (eg. soccer ball)						
14. The child throws a tennis ball underhand against the wall and catches it with two hands.						
15. The child skips forward 5 metres.						
16. The child rides a two-wheeled bike.						
17. The child changes direction readily in a running game like tag.						
18. The child catches a fly ball outside the diamond area in a game of softball.						

10 - 11 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
19. The child jumps rope with two feet together for at least three consecutive skips.						
20. The child hops through a hopscotch pattern without losing balance.						
21. The child can move away from the ball quickly in games like dodge ball.						
22. The child strikes a tetherball as it moves around the pole.						
23. The child performs in key positions such as goalie, forward or defenceman in soccer.						
24. The child performs in key positions such as catcher, pitcher or first base in softball.						
25. The child drops the ball and kicks it before it hits the ground.						
26. The child can catch a softball using a glove from a distance of 15 metres.						
27. The child can ice skate a distance of 25 metres.						
28. The child can swim a distance of 25 metres.						

10 - 11 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
29. The child kicks the ball between goal posts.						
30. The child throws a frisbee to a partner.						

10 - 11 Year Olds

CLASSROOM ITEMS	very poorly	poorly	adequately	well	very well	prediction
1. The child deals cards with a reasonable degree of speed without dropping them.						
2. The child moves around the classroom without bumping into things.						
3. The child reproduces simple geometric patterns (i.e. squares, triangles, circles) with pencil and paper.						
4. The child does up buttons.						
5. The child ties shoelaces in a bow.						
6. The child folds paper into simple patterns (i.e., squares, rectangles, triangles).						
7. The child turns pages of a book						
8. The child sharpens a pencil (i.e., putting pencil into sharpener and turning handle).						
9. The child uses an eraser.						
10. The child manipulates small objects in table games such as checkers, snakes and ladders and monopoly.						

10 - 11 Year Olds

CLASSROOM ITEMS	very poorly	poorly	adequately	well	very well	prediction
11. When colouring, the child stays within the lines.						
12. The child correctly holds a pencil for writing.						
13. The child cuts paper with scissors.						

APPENDIX F

INSTRUCTIONS TO TEACHERS

INSTRUCTIONS FOR USE OF CHECKLIST

The purpose of this checklist is to identify children who have movement learning difficulties. A number of studies indicate that we can expect to find approximately 6% of school children who meet the criteria of being physically awkward. Physically awkward children are defined as those children without known neuromuscular problems (such as mild cerebral palsy) who fail to perform age-appropriate motor skills with acceptable proficiency. It is realized that the basis for judging "acceptable proficiency" might change with different age groups, the sex of the child, and the particular socio-cultural environment. Nevertheless, in this study it is hoped that you will rate each child's performance on each behavioural statement in relation to the range of performances that you would expect to find in children of that particular age group and cultural milieu.

To help with this task, it is suggested that you use the scale illustrated in Figure 1, which relates each descriptor to the percentage of children who would perform at a particular level. In this study, you are requested to rate a child's performance on each item in relation to how well he or she typically performs it in comparison to all the children you have taught in that particular age group. Thus, a child's performance in catching which was rated as being performed "very well" would mean that the child's typical performance would usually be better than 90% of his or her peers. In order to standardize the rating process, it is suggested that you use the following procedures.

Rate each item individually. Consider the specific child and decide whether the child's typical performance would be performed very poorly, poorly, adequately, well, or very well in comparison to his or her age group peers.

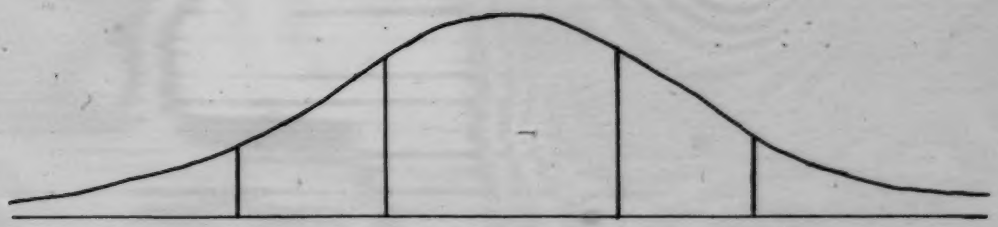


FIGURE 1

A child might perform some motor tasks well, others poorly. Therefore, it is hoped that you will consider each item individually and rate the child on that task in relation to how well his or her age peers would perform it. Your judgement of a child's performance on each motor task should be based on your past experience with all children in that age group.

If you have not actually observed the child performing the item, please place a check (✓) in the prediction column and then rate the child's performance using the following procedure. It is assumed that you will not have observed every motor behaviour that has been listed. For these items please visualize the child performing that task and predict how well he or she would perform it in relation to their age group peers. For example, you may not have a tetherball in the schoolyard. Therefore, you would rate the item as follows:

Activity Item	Very Poorly	Poorly	Adequately	Well	Very Well	Prediction
The child strikes a tetherball as it moves around the pole				✓		✓

APPENDIX G

TEACHER QUESTIONNAIRE

TEACHER QUESTIONNAIRE

The following information is required in order to help us evaluate the feasibility of the checklist. Your co-operation in completing this form is appreciated.

1. Are you presently teaching Physical Education to the children in your class? _____

2. Have you taken any courses in Physical Education? _____
   If so, how many half-term courses have you taken? _____

3. What grades have you taught and how many years have you taught each of those grades?

Grade	Years Teaching
_____	_____
_____	_____
_____	_____
_____	_____

4. What was the average length of time it took you to rate each child using the checklist? _____

5. How easy was it to understand the instructions for use of the checklist?

   very easy _____ easy _____

   difficult _____ very difficult _____

6. How easy was it to use the checklist?

   very easy _____ easy _____

   difficult _____ very difficult _____

7. Have you any comments or suggestions regarding the use of the checklist?

_____

_____

_____

_____

APPENDIX H

REVISED CHECKLISTS

Grade 3

Grade 5

8 - 9 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
1. The child executes a controlled gait while performing locomotor skills.						
2. The child changes direction while running in an obstacle course without markedly changing pace.						
3. The child performs an independent front roll (sommersault).						
4. The child marches to a fast and/or slow beat.						
5. The child keeps time to music when clapping.						
6. The child maneuvers over and between objects of varying heights in an obstacle course.						
7. The child keeps up to peers in running races.						
8. The child imitates the movement of another as in demonstrations and mirroring activities.						
9. The child catches a ball thrown 1 metre to either side of him or her.						

8 - 9 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
10. The child bounces a 20 cm playground ball with one hand three times consecutively without losing it.						
11. The child runs and kicks a ball without stopping before making contact with the ball.						
12. The child throws a tennis ball underhand against the wall and catches it with two hands.						
13. The child touches a tetherball as it moves around the pole.						
14. The child drops the ball and kicks it before it hits the ground.						
15. The child kicks the ball between goal posts.						
16. The child can ice skate a distance of 25 metres.						

10 - 11 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
1. The child keeps up to peers during running races.						
2. The child performs coordinated jumping jacks.						
3. The child can catch a ball thrown 1 metre to either the right or left side of him or her.						
4. The child throws the ball in front of a moving teammate so that the ball can be received.						
5. The child bounces a ball with one hand without losing it.						
6. The child runs and kicks a ball without stopping before making contact with it. (eg. soccer ball)						
7. The child throws a tennis ball underhand against the wall and catches it with two hands.						
8. The child skips forward 5 metres.						
9. The child changes direction readily in a running game like tag.						
10. The child catches a fly ball outside the diamond area in a game of softball.						

10 - 11 Year Olds

ACTIVITY ITEMS	very poorly	poorly	adequately	well	very well	prediction
11. The child can move away from the ball quickly in games like dodge ball.						
12. The child performs in key positions such as catcher, pitcher or first base in softball.						
13. The child drops the ball and kicks it before it hits the ground.						
14. The child can catch a softball using a glove from a distance of 15 metres.						
15. The child can ice skate a distance of 25 metres.						
16. The child kicks the ball between goal posts.						
17. The child throws a frisbee to a partner.						

APPENDIX I

FREQUENCY DATA OF GROSS-MOTOR ITEMS

Physically Awkward Group: Grade 3

Control Group: Grade 3

Physically Awkward Group: Grade 5

Control Group: Grade 5

FREQUENCY DATA

Physically Awkward Group: Grade 3

FREQUENCY DATA

Physically Awkward Group: Grade 3

VAR01

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	5	41.7	41.7	41.7
	3.	1	8.3	8.3	50.0
	4.	6	50.0	50.0	100.0
	TOTAL	12	100.0	100.0	

VALID CASES 12 MISSING CASES 0

VAR02

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	2	16.7	16.7	16.7
	2.	2	16.7	16.7	33.3
	3.	5	41.7	41.7	75.0
	4.	2	16.7	16.7	91.7
	5.	1	8.3	8.3	100.0
	TOTAL	12	100.0	100.0	

VAR03

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	8.3	8.3	8.3
	2.	2	16.7	16.7	25.0
	3.	6	50.0	50.0	75.0
	4.	3	25.0	25.0	100.0
	TOTAL	12	100.0	100.0	

VALID CASES 12 MISSING CASES 0

VAR04

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	2	16.7	16.7	16.7
	3.	3	25.0	25.0	41.7
	4.	5	41.7	41.7	83.3
	5.	2	16.7	16.7	100.0
	TOTAL	12	100.0	100.0	

VAR05

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	8.3	8.3	8.3
	3.	5	41.7	41.7	50.0
	4.	5	41.7	41.7	91.7
	5.	1	8.3	8.3	100.0
	TOTAL	12	100.0	100.0	

VAR06

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	3	25.0	25.0	25.0
	2.	1	8.3	8.3	33.3
	3.	2	16.7	16.7	50.0
	4.	4	33.3	33.3	83.3
	5.	2	16.7	16.7	100.0
	TOTAL	12	100.0	100.0	

VAR07

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	8.3	8.3	8.3
	2.	2	16.7	16.7	25.0
	3.	2	16.7	16.7	41.7
	4.	5	41.7	41.7	83.3
	5.	2	16.7	16.7	100.0
	TOTAL	12	100.0	100.0	

VAR08

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	5	41.7	41.7	41.7
	3.	3	25.0	25.0	66.7
	4.	4	33.3	33.3	100.0
	TOTAL	12	100.0	100.0	

VAR09

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	3	25.0	25.0	25.0
	2.	2	16.7	16.7	41.7
	3.	5	41.7	41.7	83.3
	4.	2	16.7	16.7	100.0
	TOTAL	12	100.0	100.0	

VAR10

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	8.3	8.3	8.3
	3.	4	33.3	33.3	41.7
	4.	4	33.3	33.3	75.0
	5.	3	25.0	25.0	100.0
	TOTAL	12	100.0	100.0	

VAR11

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	3	25.0	25.0	25.0
	3.	4	33.3	33.3	58.3
	4.	4	33.3	33.3	91.7
	5.	1	8.3	8.3	100.0
	TOTAL	12	100.0	100.0	

VAR12

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	8.3	8.3	8.3
	2.	3	25.0	25.0	33.3
	3.	2	16.7	16.7	50.0
	4.	6	50.0	50.0	100.0
	TOTAL	12	100.0	100.0	

VAR13

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	2	16.7	16.7	16.7
	3.	5	41.7	41.7	58.3
	4.	3	25.0	25.0	83.3
	5.	2	16.7	16.7	100.0
	TOTAL	12	100.0	100.0	

VAR14

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	2	16.7	16.7	16.7
	2.	2	16.7	16.7	33.3
	3.	6	50.0	50.0	83.3
	4.	2	16.7	16.7	100.0
	TOTAL	12	100.0	100.0	

VAR15

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	5	41.7	41.7	41.7
	3.	2	16.7	16.7	58.3
	4.	3	25.0	25.0	83.3
	5.	2	16.7	16.7	100.0
	TOTAL	12	100.0	100.0	

VAR16

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	4	33.3	33.3	33.3
	3.	4	33.3	33.3	66.7
	4.	3	25.0	25.0	91.7
	5.	1	8.3	8.3	100.0
	TOTAL	12	100.0	100.0	

VAR17

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	2	16.7	16.7	16.7
	2.	4	33.3	33.3	50.0
	3.	3	25.0	25.0	75.0
	4.	2	16.7	16.7	91.7
	5.	1	8.3	8.3	100.0
	TOTAL	12	100.0	100.0	

VAR18

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	2	16.7	16.7	16.7
	2.	2	16.7	16.7	33.3
	3.	2	16.7	16.7	50.0
	4.	2	16.7	16.7	66.7
	5.	4	33.3	33.3	100.0
	TOTAL	12	100.0	100.0	

VAR18

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	8.3	8.3	8.3
	2.	1	8.3	8.3	16.7
	3.	3	25.0	25.0	41.7
	4.	5	41.7	41.7	83.3
	5.	2	16.7	16.7	100.0
	TOTAL	12	100.0	100.0	

VAR20

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	2	16.7	16.7	16.7
	3.	5	41.7	41.7	58.3
	4.	1	8.3	8.3	66.7
	5.	3	25.0	25.0	91.7
	9.	1	8.3	8.3	100.0
	TOTAL	12	100.0	100.0	

VAR21

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	3	25.0	25.0	25.0
	3.	2	16.7	16.7	41.7
	4.	4	33.3	33.3	75.0
	5.	3	25.0	25.0	100.0
	TOTAL	12	100.0	100.0	

VAR22

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	3	25.0	25.0	25.0
	3.	2	16.7	16.7	41.7
	4.	3	25.0	25.0	66.7
	5.	4	33.3	33.3	100.0
	TOTAL	12	100.0	100.0	

VAR23

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	3	25.0	25.0	25.0
	3.	7	58.3	58.3	83.3
	4.	1	8.3	8.3	91.7
	5.	1	8.3	8.3	100.0
	TOTAL	12	100.0	100.0	

VAR24

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	5	41.7	41.7	41.7
	3.	3	25.0	25.0	66.7
	4.	4	33.3	33.3	100.0
	TOTAL	12	100.0	100.0	

VAR25

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	8	66.7	66.7	66.7
	4.	4	33.3	33.3	100.0
	TOTAL	12	100.0	100.0	

VAR26

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	8.3	8.3	8.3
	2.	4	33.3	33.3	41.7
	3.	1	8.3	8.3	50.0
	4.	4	33.3	33.3	83.3
	5.	1	8.3	8.3	91.7
	9.	1	8.3	8.3	100.0
	TOTAL	12	100.0	100.0	

FREQUENCY DATA

Control Group: Grade 3

FREQUENCY DATA

Control Group: Grade 3

VARO1

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	4	28.6	28.6	28.6
	4.	4	28.6	28.6	57.1
	5.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VARO2

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	5	35.7	35.7	35.7
	4.	4	28.6	28.6	64.3
	5.	5	35.7	35.7	100.0
	TOTAL	14	100.0	100.0	

VARO3

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	6	42.9	42.9	42.9
	4.	4	28.6	28.6	71.4
	5.	4	28.6	28.6	100.0
	TOTAL	14	100.0	100.0	

VAR04

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	5	35.7	35.7	35.7
	4.	3	21.4	21.4	57.1
	5.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR05

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	3	21.4	21.4	21.4
	4.	5	35.7	35.7	57.1
	5.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR06

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	3	21.4	21.4	21.4
	4.	5	35.7	35.7	57.1
	5.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR07

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	3	21.4	21.4	21.4
	4.	7	50.0	50.0	71.4
	5.	4	28.6	28.6	100.0
	TOTAL	14	100.0	100.0	

VAR08

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	3	21.4	21.4	28.6
	4.	8	57.1	57.1	85.7
	5.	2	14.3	14.3	100.0
	TOTAL	14	100.0	100.0	

VAR09

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	5	35.7	35.7	42.9
	4.	3	21.4	21.4	64.3
	5.	5	35.7	35.7	100.0
	TOTAL	14	100.0	100.0	

VAR10

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	3	21.4	21.4	21.4
	4.	5	35.7	35.7	57.1
	5.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR11

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	5	35.7	35.7	42.9
	4.	6	42.9	42.9	85.7
	5.	2	14.3	14.3	100.0
	TOTAL	14	100.0	100.0	

VAR12

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	3	21.4	21.4	21.4
	4.	8	57.1	57.1	78.6
	5.	2	14.3	14.3	92.9
	9.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR13

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	2	14.3	14.3	14.3
	3.	5	35.7	35.7	50.0
	4.	6	42.9	42.9	92.9
	5.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR14

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	2	14.3	14.3	14.3
	3.	3	21.4	21.4	35.7
	4.	6	42.9	42.9	78.6
	5.	3	21.4	21.4	100.0
	TOTAL	14	100.0	100.0	

VAR15

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	5	35.7	35.7	35.7
	4.	3	21.4	21.4	57.1
	5.	5	35.7	35.7	92.9
	9.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR16

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	6	42.9	42.9	42.9
	4.	2	14.3	14.3	57.1
	5.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR17

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	2	14.3	14.3	14.3
	3.	4	28.6	28.6	42.9
	4.	2	14.3	14.3	57.1
	5.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR18

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	5	35.7	35.7	42.9
	4.	6	42.9	42.9	85.7
	5.	2	14.3	14.3	100.0
	TOTAL	14	100.0	100.0	

VAR19

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	4	28.6	28.6	28.6
	4.	4	28.6	28.6	57.1
	5.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR20

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	5	35.7	35.7	35.7
	4.	5	35.7	35.7	71.4
	5.	3	21.4	21.4	92.9
	9.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR21

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	4	28.6	28.6	28.6
	3.	2	14.3	14.3	42.9
	4.	4	28.6	28.6	71.4
	5.	4	28.6	28.6	100.0
	TOTAL	14	100.0	100.0	

VAR22

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	4	28.6	28.6	35.7
	4.	6	42.9	42.9	78.6
	5.	3	21.4	21.4	100.0
	TOTAL	14	100.0	100.0	

VAR23

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	7	50.0	50.0	50.0
	4.	4	28.6	28.6	78.6
	5.	2	14.3	14.3	92.9
	9.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR24

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	5	35.7	35.7	42.9
	4.	2	14.3	14.3	57.1
	5.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR25

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	4	28.6	28.6	35.7
	4.	3	21.4	21.4	57.1
	5.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR26

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	4	28.6	28.6	35.7
	4.	5	35.7	35.7	71.4
	5.	4	28.6	28.6	100.0
	TOTAL	14	100.0	100.0	

FREQUENCY DATA

Physically Awkward Group: Grade 5

FREQUENCY DATA

Physically Awkward Group: Grade 5

VARO1

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	8	57.1	57.1	57.1
	4.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VARO2

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	7	50.0	50.0	57.1
	4.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VARO3

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	7	50.0	50.0	50.0
	4.	7	50.0	50.0	100.0
	TOTAL	14	100.0	100.0	

VAR04

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	5	35.7	35.7	42.9
	4.	6	42.9	42.9	85.7
	5.	2	14.3	14.3	100.0
	TOTAL	14	100.0	100.0	

VAR05

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	9	64.3	64.3	71.4
	4.	4	28.6	28.6	100.0
	TOTAL	14	100.0	100.0	

VAR06

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	7.1	7.1	7.1
	2.	3	21.4	21.4	28.6
	3.	4	28.6	28.6	57.1
	4.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR07

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	7	50.0	50.0	50.0
	4.	7	50.0	50.0	100.0
	TOTAL	14	100.0	100.0	

VAR08

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	7	50.0	50.0	50.0
	4.	6	42.9	42.9	92.9
	5.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR09

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	5	35.7	35.7	35.7
	4.	7	50.0	50.0	85.7
	5.	2	14.3	14.3	100.0
	TOTAL	14	100.0	100.0	

VAR10

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	2	14.3	14.3	14.3
	3.	9	64.3	64.3	78.6
	4.	3	21.4	21.4	100.0
	TOTAL	14	100.0	100.0	

VAR11

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	3	21.4	21.4	21.4
	3.	8	57.1	57.1	78.6
	4.	3	21.4	21.4	100.0
	TOTAL	14	100.0	100.0	

VAR12

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	2	14.3	14.3	14.3
	3.	6	42.9	42.9	57.1
	4.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR13

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	5	35.7	35.7	35.7
	3.	3	21.4	21.4	57.1
	4.	5	35.7	35.7	92.9
	5.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR14

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	8	57.1	57.1	57.1
	4.	6	42.9	42.9	100.0
	TOTAL	14	100.0	100.0	

VAR15

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	8	57.1	57.1	64.3
	4.	5	35.7	35.7	100.0
	TOTAL	14	100.0	100.0	

VAR16

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	4	28.6	28.6	28.6
	4.	7	50.0	50.0	78.6
	5.	3	21.4	21.4	100.0
	TOTAL	14	100.0	100.0	

VAR17

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	3	21.4	21.4	21.4
	3.	3	21.4	21.4	42.9
	4.	7	50.0	50.0	92.9
	5.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR18

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	7.1	7.1	7.1
	2.	7	50.0	50.0	57.1
	3.	4	28.6	28.6	85.7
	4.	2	14.3	14.3	100.0
	TOTAL	14	100.0	100.0	

VAR19

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	7	50.0	50.0	50.0
	4.	2	14.3	14.3	64.3
	5.	5	35.7	35.7	100.0
	TOTAL	14	100.0	100.0	

VAR20

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	5	35.7	35.7	35 7
	4.	5	35.7	35.7	71.4
	5.	4	28.6	28.6	100.0
	TOTAL	14	100.0	100.0	

VAR21

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	3	21.4	21.4	21.4
	3.	5	35.7	35.7	57.1
	4.	4	28.6	28.6	85.7
	5.	2	14.3	14.3	100.0
	TOTAL	14	100.0	100.0	

VAR22

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	9	64.3	64.3	71.4
	4.	4	28.6	28.6	100.0
	TOTAL	14	100.0	100.0	

VAR23

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	7.1	7.1	7.1
	2.	5	35.7	35.7	42.8
	3.	3	21.4	21.4	64.3
	4.	4	28.6	28.6	92.9
	5.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR24

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	7.1	7.1	7.1
	2.	8	57.1	57.1	64.3
	3.	4	28.6	28.6	92.9
	4.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR25

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	2	14.3	14.3	14.3
	2.	3	21.4	21.4	35.7
	3.	5	35.7	35.7	71.4
	4.	3	21.4	21.4	92.9
	5.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

VAR26

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	7.1	7.1	7.1
	2.	5	35.7	35.7	42.9
	3.	6	42.9	42.9	85.7
	4.	2	14.3	14.3	100.0
	TOTAL	14	100.0	100.0	

VAR27

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	7.1	7.1	7.1
	2.	2	14.3	14.3	21.4
	3.	9	64.3	64.3	85.7
	4.	2	14.3	14.3	100.0
	TOTAL	14	100.0	100.0	

VAR28

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	1	7.1	7.1	7.1
	2.	6	42.9	42.9	50.0
	3.	4	28.6	28.6	78.6
	4.	3	21.4	21.4	100.0
	TOTAL	14	100.0	100.0	

VAR29

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.1	7.1	7.1
	3.	7	50.0	50.0	57.1
	4.	4	28.6	28.6	85.7
	5.	2	14.3	14.3	100.0
	TOTAL	14	100.0	100.0	

VAR30

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	3	21.4	21.4	21.4
	3.	8	57.1	57.1	78.6
	4.	2	14.3	14.3	92.9
	5.	1	7.1	7.1	100.0
	TOTAL	14	100.0	100.0	

FREQUENCY DATA

Control Group: Grade 5

FREQUENCY DATA

Control Group: Grade 5

VARO1

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.7	7.7	7.7
	3.	3	23.1	23.1	30.8
	4.	7	53.8	53.8	84.6
	5.	2	15.4	15.4	100.0
	TOTAL	13	100.0	100.0	

VARO2

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.7	7.7	7.7
	3.	3	23.1	23.1	30.8
	4.	5	38.5	38.5	69.2
	5.	4	30.8	30.8	100.0
	TOTAL	13	100.0	100.0	

VARO3

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	4	30.8	30.8	30.8
	4.	4	30.8	30.8	61.5
	5.	5	38.5	38.5	100.0
	TOTAL	13	100.0	100.0	

VAR04

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	3	23.1	23.1	23.1
	4.	5	38.5	38.5	61.5
	5.	5	38.5	38.5	100.0
	TOTAL	13	100.0	100.0	

VAR05

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	6	46.2	46.2	46.2
	4.	5	38.5	38.5	84.6
	5.	2	15.4	15.4	100.0
	TOTAL	13	100.0	100.0	

VAR06

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	5	38.5	38.5	38.5
	4.	4	30.8	30.8	69.2
	5.	4	30.8	30.8	100.0
	TOTAL	13	100.0	100.0	

VAR07

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	6	46.2	46.2	46.2
	4.	3	23.1	23.1	69.2
	5.	4	30.8	30.8	100.0
	TOTAL	13	100.0	100.0	

VAR08

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	2	15.4	15.4	15.4
	4.	6	46.2	46.2	61.5
	5.	5	38.5	38.5	100.0
	TOTAL	13	100.0	100.0	

VAR09

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.7	7.7	7.7
	3.	2	15.4	15.4	23.1
	4.	6	46.2	46.2	69.2
	5.	4	30.8	30.8	100.0
	TOTAL	13	100.0	100.0	

VAR10

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	4	30.8	30.8	30.8
	4.	4	30.8	30.8	61.5
	5.	5	38.5	38.5	100.0
	TOTAL	13	100.0	100.0	

VAR11

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	6	46.2	46.2	46.2
	4.	5	38.5	38.5	84.6
	5.	2	15.4	15.4	100.0
	TOTAL	13	100.0	100.0	

VAR12

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	4	30.8	30.8	30.8
	4.	2	15.4	15.4	46.2
	5.	7	53.8	53.8	100.0
	TOTAL	13	100.0	100.0	

VAR13

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	3	23.1	23.1	23.1
	4.	4	30.8	30.8	53.8
	5.	6	46.2	46.2	100.0
	TOTAL	13	100.0	100.0	

VAR14

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	4	30.8	30.8	30.8
	4.	3	23.1	23.1	53.8
	5.	6	46.2	46.2	100.0
	TOTAL	13	100.0	100.0	

VAR15

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.7	7.7	7.7
	3.	2	15.4	15.4	23.1
	4.	3	23.1	23.1	46.2
	5.	7	53.8	53.8	100.0
	TOTAL	13	100.0	100.0	

VAR16

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	3	23.1	23.1	23.1
	4.	7	53.8	53.8	76.9
	5.	3	23.1	23.1	100.0
	TOTAL	13	100.0	100.0	

VAR17

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	1	7.7	7.7	7.7
	4.	7	53.8	53.8	61.5
	5.	5	38.5	38.5	100.0
	TOTAL	13	100.0	100.0	

VAR18

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	2	15.4	15.4	15.4
	3.	5	38.5	38.5	53.8
	4.	5	38.5	38.5	92.3
	5.	1	7.7	7.7	100.0
	TOTAL	13	100.0	100.0	

VAR19

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.7	7.7	7.7
	3.	4	30.8	30.8	38.5
	4.	1	7.7	7.7	46.2
	5.	7	53.8	53.8	100.0
	TOTAL	13	100.0	100.0	

VAR20

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.7	7.7	7.7
	3.	4	30.8	30.8	38.5
	4.	1	7.7	7.7	46.2
	5.	7	53.8	53.8	100.0
	TOTAL	13	100.0	100.0	

VAR21

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	3	23.1	23.1	23.1
	4.	6	46.2	46.2	69.2
	5.	4	30.8	30.8	100.0
	TOTAL	13	100.0	100.0	

VAR22

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.7	7.7	7.7
	3.	8	61.5	61.5	69.2
	4.	3	23.1	23.1	92.3
	5.	1	7.7	7.7	100.0
	TOTAL	13	100.0	100.0	

VAR23

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.7	7.7	7.7
	3.	6	46.2	46.2	53.8
	4.	3	23.1	23.1	76.9
	5.	3	23.1	23.1	100.0
	TOTAL	13	100.0	100.0	

VAR24

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	3	23.1	23.1	23.1
	3.	6	46.2	46.2	69.2
	4.	3	23.1	23.1	92.3
	5.	1	7.7	7.7	100.0
	TOTAL	13	100.0	100.0	

VAR25

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	6	46.2	46.2	46.2
	4.	6	46.2	46.2	92.3
	5.	1	7.7	7.7	100.0
	TOTAL	13	100.0	100.0	

VAR26

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	1	7.7	7.7	7.7
	3.	8	61.5	61.5	69.2
	4.	1	7.7	7.7	76.9
	5.	3	23.1	23.1	100.0
	TOTAL	13	100.0	100.0	

VAR27

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	2.	2	15.4	15.4	15.4
	3.	5	38.5	38.5	53.8
	4.	3	23.1	23.1	76.9
	5.	3	23.1	23.1	100.0
	TOTAL	13	100.0	100.0	

VAR28

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1.	3	23.1	23.1	23.1
	2.	1	7.7	7.7	30.8
	3.	8	61.5	61.5	92.3
	5.	1	7.7	7.7	100.0
	TOTAL	13	100.0	100.0	

VAR29

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	1	7.7	7.7	7.7
	4.	7	53.8	53.8	61.5
	5.	5	38.5	38.5	100.0
	TOTAL	13	100.0	100.0	

VAR30

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	3.	3	23.1	23.1	23.1
	4.	7	53.8	53.8	76.9
	5.	3	23.1	23.1	100.0
	TOTAL	13	100.0	100.0	

APPENDIX J

RAW SCORE VALUES FOR CHECKLIST ITEMS

Grade 3

Grade 5

Table 8

Raw Score Values for Checklist Items
for PA and Control Treatment Groups (Grade 3)

	Physically Awkward	Control
N	12	13
ΣX	571.00	816.00
$\bar{X}$	47.58	62.76
$\Sigma(X-\bar{X})$	1723.00	1890.37

Table 9

Raw Score Values for Checklist Items
for PA and Control Treatment Groups (Grade 5)

	Physically Awkward	Control
N	14	13
ΣX	733.00	863.00
$\bar{X}$	52.30	66.30
$\Sigma(X-\bar{X})$	776.66	907.17

APPENDIX K

TOTAL SCORES: PHYSICALLY AWKWARD AND CONTROLS

Grade 3

Grade 5

Figure 1.

Total Scores: Physically Awkward and Controls

Grade 3

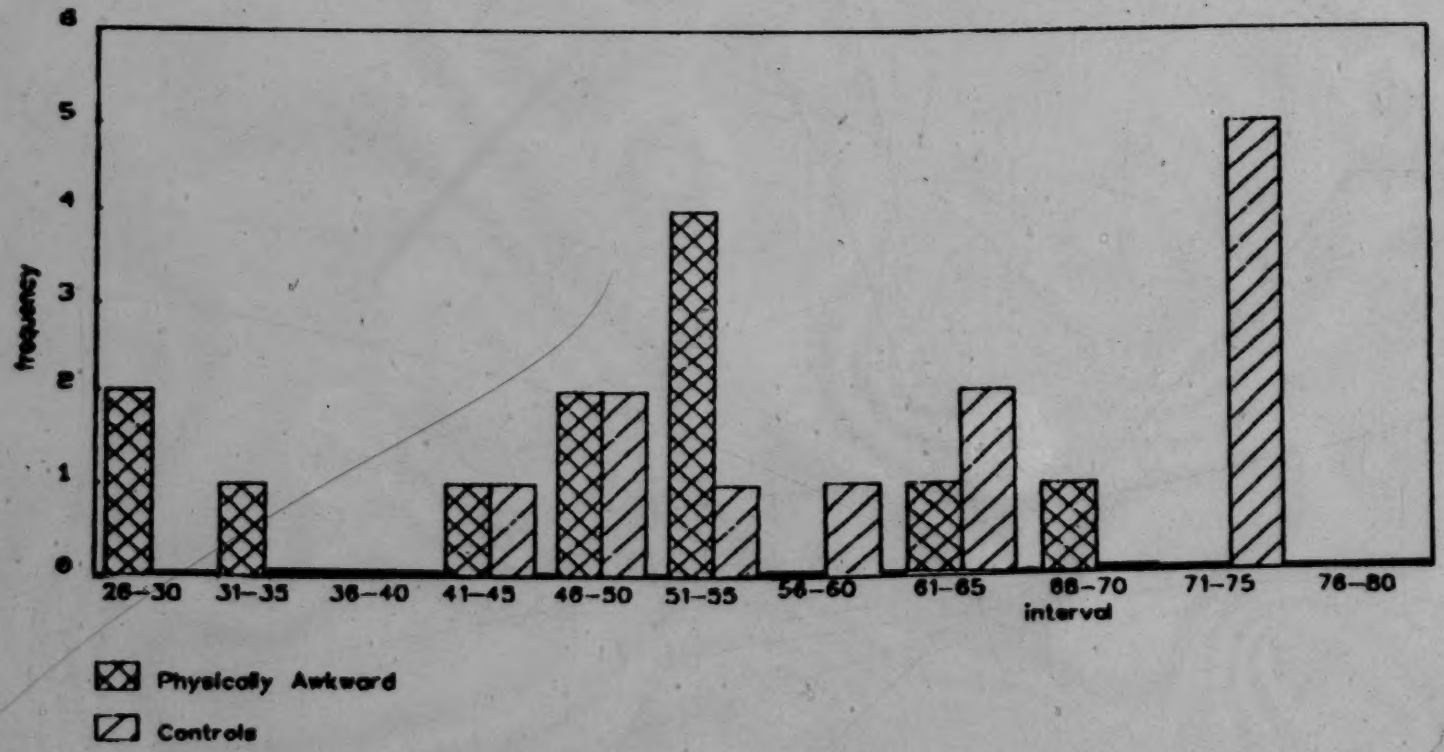
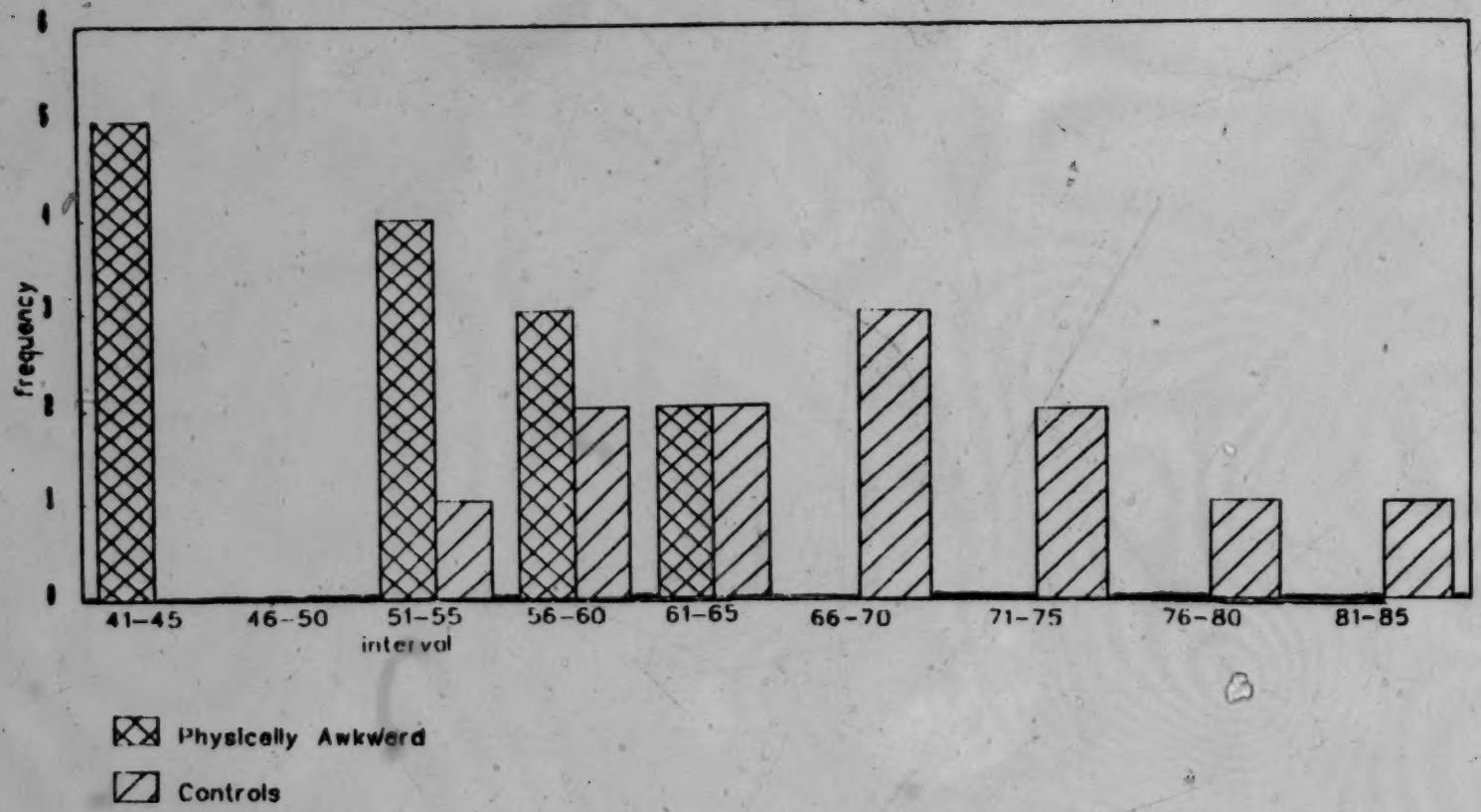


Figure 2.

Total Scores: Physically Awkward and Controls

Grade 5